THE NEXT AGE OF MAN

ALBERT EDWARD WIGGAM

Copy of the bronze medallion given by the American Eugenics Society to winners of first prize in Fitter Families Contests now regular features of a number of State Fairs.

THE NEXT AGE OF MAN

By

ALBERT EDWARD WIGGAM

Author of

THE NEW DECALOGUE OF SCIENCE

THE FRUIT OF THE FAMILY TREE

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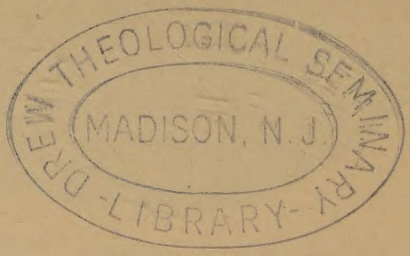

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To

FREDERICK ADAMS WOODS

Biologist, biometrician, historiometer—lover of truth—of whom a renowned scientist said: "I have watched his genius for twenty years and have never known him to be wrong."

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INTRODUCTION

This book is the outcome of a telegram that I received on one occasion from Dean Carl E. Seashore, asking me to deliver an address on "Some Aspects of Eugenics" to the Graduate School of the University of Iowa. The address had the good fortune to be kindly received by the scientific men present. At the urgent suggestion of a number of friends I have rather reluctantly enlarged the discussion into a book. This does not mean that all of my scientific friends have agreed with its major premises. They have not. They have, however, believed that I had presented some aspects of man's probable future on this earth which merited more extended discussion. Hence this book.

If I am wrong, no praise from friends or critics will make me right; if I am right, no adverse criticism will make me wrong. The effort to improve man's organic constitution is the most difficult and complex problem to which human intelligence has ever addressed itself. It would, therefore, not be surprising if, during the first one or two hundred years, we should all be wrong. As long, however, as men seek the truth by critical methods, instead of by mystical contemplation, the truth will ultimately come out of their very errors. Should this entire volume be wrong, it will nevertheless be of service in getting that much of the discussion out of the way, and making its error manifest.

Eugenical truth is the highest truth men will ever know. The climax of all natural processes is the evolution of man. And if man can, by the use of the intelligence which that evolution has given him, aid in

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his further evolution, it will certainly be the highest achievement which the powers given him by nature will ever enable him to make. Eugenics will not solve all the problems of society; but it hopes to aid in producing a race that can solve them.

My own belief is that biology and psychology have recently placed in our hands new and powerful instruments and agencies by which man can greatly accelerate his own evolution, and that these discoveries of science are going to usher in a new age of man. Human nature, I think, has profoundly changed within the past ten or fifteen thousand years. I believe we are better men than have ever lived; also that human nature is going to change even more rapidly in the comparatively near future than it has ever changed in the past. Beyond question, there is going on, all around us, a rising tide of degeneracy; but right in the midst of it, I am convinced, there is also going on a rising tide of biological capacity. I believe that civilization has in the past ten or fifteen thousand years been slowly evolving a naturally civilized man; and that science is about to place in our hands discoveries which will greatly increase this process in rapidity of action and definiteness of result. There are, here and there, people who are naturally good, naturally sane, healthy, intelligent and long-lived. These people are naturally happy and naturally civilizable. I believe that through the use of the new instrumentalities of science these people are going, in the course of no great time, to constitute the main body of the population.

To maintain the foregoing thesis is the aim of this essay.

My thanks are due to Dean Seashore for having stimulated me to lay the foundations of the book. *The World's Work, Collier's Weekly* and the Metro-

politan Newspaper Syndicate have kindly permitted me to draw upon articles of mine which they have published. Mr. Alfred A. Knopf, publisher, and Dr. Raymond Pearl, Director of the Institute of Biological Research of Johns Hopkins University, have extended to me exceptional courtesies in the matter of using extracts from Doctor Pearl's researches. I am grateful to Dr. J. McKeen Cattell, also, for permission to make quotations from the various Journals of the Science Press. Prof. Karl Pearson, Director of the Galton Laboratory of London, has personally extended me the privilege of making extracts from the *Annals of Eugenics* and other publications from his laboratory. I have acknowledged, in my dedication, my indebtedness to Frederick Adams Woods. Mrs. Wiggam has done an enormous amount of reading and correlating of technical material for me. Without her assistance the volume would not have been possible.

The public has been extraordinarily kind in its reception of my previous writings. I can here express only feebly my profound sense of gratitude, as it is beyond my physical power to reply to all of the many grateful readers who have so kindly written me. My hope is that this present volume will, at least, not decrease this interest and generosity.

A. E. Wiggam.

New York City,
January 15th, 1927.

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SECTION ONE
CAN WE REMAIN CIVILIZED?

THE NEXT AGE OF MAN

I

THE EVOLUTION OF A CIVILIZED MAN

When some disgruntled genius of the jungle, dissatisfied with the lack of soap, newspapers and underwear, got up the idea of civilization, he unwittingly let the "so-called human race" in for a host of unexpected troubles. He, no doubt, held out to his fellows a glittering prospect of wealth, comfort, loafing, rapid transit, limousines, pullmans, medicines, hospitals, welfare workers, radio, airplanes, chewing gum and telephones; a vote, a college education, and three square meals a day for everybody; and the Salvation Army to take care of the unfit. It took him several thousand years to put the scheme over; there have been a good many hitches in the program, and, indeed, quite a sizable portion of the human race is not "sold" on the idea yet.

But on the whole he has made good on his prospectus. When we compare the foregoing inventory of his present stock in trade and his rather conspicuous state of solvency to-day with the impressive absence in the jungle of these modern conveniences—commonly referred to nowadays as "necessities"—we are forced to admit that he has made no small success of his enterprise. True, there is still a bit of dissatisfaction here and there as to the "distribution" of

these so-called "goods,"—some asserting that they receive too little of the chewing gum, loafing and college education, and too much attention from the Salvation Army; but on the whole, things seem better since philosophy, science, art and education were invented than they were prior to these creations of the intelligence and sense of the æsthetic.

Indeed, there have been several occasions, notably in Babylon, Greece, Rome and other centers of art, philosophy and trade, when it seemed as though "progress" had come to stay, and from then on all anybody would have to do would be merely to get on it and ride; in fact, in two or three instances it has seemed as though mankind were just about to ride into the millennium. But in every instance a monkey-wrench has been thrown into the machinery by parties unknown—at least, historians and philosophers are still busy trying to identify the culprits. Some have insisted it was the crowd that changed the trade routes and "economic conditions"; some that it was the busybody who devised birth control and sold it to the fit at so high a price that it could not be purchased by the unfit; others, that it was the moron who invented democracy; while still others have laid a good deal on the doorstep of the peace-loving Chinese who invented gunpowder.

But whatever caused the breakdown of the machinery, sometimes it has been so complete that it has looked as though the whole idea would have to be given up. Especially at the close of the Roman effort it hardly seemed worth while trying again. But new blood came in from the outside—peoples who had not yet had a chance to try one of these new-fangled civilized joy rides—and, barring a few considerable setbacks such as the Thirty Years' War, the World War, the rise of the bootleggers to opulence and social

distinction, and similar discouragements, things have at last begun to look a bit hopeful again.

However, the very success of the enterprise has given leisure, opportunity and stimulus to a few heretofore unoccupied minds known as biologists, psychologists and biometricians, to inquire whether there may not be forces seated in the very nature of human nature which have been important and possibly decisive factors in determining both the rise and dissolution of the societies of the past. They are also inquiring whether these forces may not be corralled and made to work both for the organic improvement of man and the success of the social undertaking instead of, as heretofore, sometimes against them. If this should turn out to be feasible, these students believe that we could develop a culture, a system of education, a set of social ideals and taboos, a political and economic organization which would make luxury, art, ease, wealth, gaiety, liberty and beauty just as natural and healthful an environment for man and one which would work just as powerfully for his continuous improvement in energy, sanity and moral character, as did the jungle with its soil constantly soaked with his own blood.

In short, human intelligence has at last turned itself to an enthusiastic consideration of the question which the inventors of civilization entirely overlooked. This oversight, the biologists believe, has been a prime cause of a great deal of the trouble that has beset the human pathway. That question is, whether social processes can not be devised which will work in harmony with those organic evolutionary processes by which man has climbed from his humble beginnings to his present high estate. For the thing which strikes the historian who has been schooled in biological and psychological fact and theory is that these two pro-

cesses have to a considerable extent always run counter to each other. And he is beginning to believe that unless, in the future, civilization can be founded upon new organizing principles, these two processes will always conflict and will, periodically, completely cancel each other and hurl man back into the mêlée of natural selection from which he has so painfully emerged.

In considering this situation, perhaps the most astonishing thing that strikes us—especially since we have come to penetrate some of the deeper levels of the natural human trends—is that so rude a barbarian, endowed with so many tendencies at complete variance with culture and social life, should have ever made such a gentleman out of himself as he has. No one, I think, can contemplate, for example, such a fact as one which Mr. Madison Grant points out—namely, that of the wild, blood-drinking Nordic coming out of the snows of the north into Normandy, and from there, within only one hundred and fifty years, entering England as the finest gentleman the world up to that time had ever seen—without feeling profound surprise that such a thing was possible to that sort of human nature.

Yet, with this and a thousand other similarly astonishing social feats to his credit, man has never quite succeeded in producing a sufficient proportion of gentlemen and socially minded persons in any of his communities to keep these communities going permanently. A result was, as Stanley Hall asserted shortly before his death, that "man has never yet demonstrated that he can remain permanently civilized." As a consequence, a few students are beginning to wonder whether this may not have been because man's civilizations have been "rigged" biologically so that, as they became more and more complex and

needed more and more intelligence and social capacity to man them, they have failed to evolve a type of man better adapted and more richly endowed by nature for carrying them on than was the crude, uncouth barbarian who began the undertaking. These students are at last beginning to believe that if man is to remain permanently civilized he must build a civilization which will by its own processes evolve a naturally civilized man, a man whose very inborn aptitudes and temperament are better adapted to a civilized life than those of his badly mannered forbears.

THE JUNGLE A HARD SCHOOL

Indeed, on the very face of it this seems a far-fetched theory; certainly one opposed to our experience with probability—even to expect that a jungle discipline would evolve a creature who would be naturally at home in drawing rooms, colleges and machine shops. No one who still believes to any extent in Darwinian selection as a factor in evolution will doubt that drawing rooms, colleges, machine shops and other civilized contrivances began, the moment they were instituted, to select out for preservation those breeds especially adapted to carrying on that kind of life. But this process has, somehow, either never worked rapidly enough, or else has never had long enough time in which to work, to produce enough naturally parlor-bred, hand-fed—that is, naturally social—men, to make them the chief part of the population.

It is easily evident that the hard, coöperative work and the demands upon sheer intelligence and moral character which civilization necessitates run considerably against the grain in man's natural constitution. For example, as suggested by Prof. G. W. T. Patrick of Iowa University, only by the hardest kind of

work can we collect a score of people to contemplate a superlative work of art. At the same time, with moderate effort we can get one hundred and fifty persons out to hear a public student debate or an oratorical contest; with a little more effort we can get a couple of thousand to witness a tennis match; while with no effort at all we can get twenty thousand to witness a baseball game, a hundred thousand to witness a football game, and a hundred and fifty thousand to witness a prize-fight—with, at the same time, the whole population of America, young and old, Christian and Jewish, rich and poor, maimed, halt and blind, hanging on the radio, listening to every blow that is given and either mentally or financially wagering on the result. It strongly indicates that the masses of men are civilized only because a few leaders have forced them to behave themselves. It seems pretty evident from the analysis of human traits now emerging from the laboratories that civilization is a scheme got up by a comparatively few, and that it has been with only indifferent success forced on the many. For the average man has nothing to do with progress except to hold it back. His leaders supply him with plenty of propaganda and ready-made slogans, so that he imagines he really has something to do with what is going on. And the saddest thing which strikes a biologist when he discovers the disastrous effect of civilization on man's natural constitution—his inborn strength, intelligence and moral character—is that even these leaders have always mistaken the social progress which they were creating for natural progress in the inborn characteristics of man. They have supposed that if they could improve man's surroundings, his manners and education, this would not only cause an improvement in his nature, but would be in itself an actual improvement in man's natural traits and capacity. As I shall show later, a slight mechan-

ical difficulty in the egg-cell from which human beings are born renders this supposition extremely doubtful. Indeed, what actually happens to the human form and mind divine in a state of civilization—as a biologist views it, at least—I think I can throw into easy relief by a very simple parable.

A PARABLE OF WHEAT AND MEN *

A certain man had two ears of wheat, the grains large in size, of equal vigor and freedom from disease. He planted the grains from one in rich, mellow soil and the others in hard, sterile soil. He gave them equal care and cultivation. They each received an equal amount of air, moisture and sunshine. At the end of the season those planted in the rich soil yielded him both a richer harvest and much larger ears. He congratulated himself that he had discovered a simple and easy method of improving the *inborn quality* of his whole race of wheat; that is, the method of providing an improved environment.

The results of the improved environment were so immediate and unmistakable that he failed to inquire what had gone on inside the plants themselves.

Being, however, of an experimental turn of mind, he saved all the grains from both lots for seed, just as we save all human beings for reproduction. He therefore planted all the wheat from both lots again in the same sort of ground as before, those from the rich soil back in the rich soil and the others in the poor soil.

At the end of a few seasons, however, he began to

* I have used wheat to illustrate the foregoing parable on the advice of Edward M. East, Professor of Genetics, Harvard University. Prof. East advises me that there are a few genetical and practical difficulties, some of them not yet completely understood, which rather over-simplify the application of this parable to human evolution. He believes that the broad general principles of the parable are applicable with these reservations. The writer intends only to draw an illustrative analogy.

suspect that something was going wrong with his stocks. He found among those grown continuously in the rich soil an enormous number of little grains. He was unable to account for this, as he had started out only with large ones. True, there were still many good-sized grains from the rich soil, but what discouraged him was the increasing number of little ones. When he considered the general *average* size of this entire stock he found it greatly reduced from that of the original lot. He also found that disease had set in among them, while the ones from the poor soil seemed strangely unaffected by disease. He concluded that his *soil, not his seed,* was deteriorating, and also that he had not expended sufficient time and skill in cultivation.

WHEAT AND EDUCATION

He therefore bought expensive fertilizers, and redoubled his efforts at tillage. But his fertilizers brought him only a new disappointment. For a time they did give him a few extraordinarily large specimens, but even these were not free from disease. Indeed, both the fertilizers and the extra efforts at cultivation seemed only to promote both the amount of disease in his rich-soil wheat and to increase the number of small, puny grains. One thing also that had struck him all along about his poor-soil wheat was that, while at first the hard environment decreased its average size, yet the plants remained free from disease and, as time went on, gradually improved slightly in size and quality.

He now had two pictures before him. First, the rich soil had given him size and abundance, all mixed with disease and littleness, with a gradual tendency of his whole stock toward general degradation. On the other hand, the hard, forbidding soil had apparently preserved the vitality of his stock and kept it

free from disease, but had given him very little in the way of food.

APPLYING HUMAN INTELLIGENCE TO AGRICULTURAL AFFAIRS

All this experience led our farmer to take a new tack. He selected a large, general *random* sample of his rich-soil wheat and planted the grains in the poor soil, and at the same time he transferred a similar sample from the lot bred in the meagre ground to the rich and stimulating environment.

To his amazement, the whole picture was instantly reversed. The wheat from the poor soil, when transferred to the rich environment, leaped up at once to great size and vigor, and even exceeded its original size of years before, when he began his experiment. The seeds were practically all healthy and of good proportions, while, on the other hand, those taken from the comfortable environment and put into the hard, ruthless soil had become so weakened that they scarcely survived at all.

At last there dawned on his mind, from this expensive experience, a new idea. From the new lot, hardened by their long experience in sterile soil, which had weeded out their weaklings, their diseased and unfit, and which he had now tried for a season in his rich soil and found to respond magnificently to luxury and cultivation, he selected *not a random sample,* but the finest, healthiest and largest specimens he could find, and saved them for seed. The remainder he used for his own food or sent to the market.

The next season he planted his selected seeds in his most luxurious soil and gave them every possible care and nourishment. When the harvest came he found himself richly rewarded for his use of intelligence. The crop from his selected seeds was the finest and largest and the freest from disease that he had ever grown. His fame went abroad and his neighbors came

to purchase seed. The superstitious actually believed that he had been somehow blessed by Heaven or that some special god of wheat had bestowed his favors on this particular breed.

As a matter of fact, what the farmer had done in his first experiment was to defy nature's laws by preserving all his weaklings for seed. He thus gave them as good a chance as the strong and healthy; in good soil they reproduced their weakness and spread it throughout the entire race. Thus, his very efforts to improve the environment had been the chief cause of his *racial* disaster. But in his second experiment the farmer had obeyed nature's laws in two directions: First, he had selected out his weaklings and prevented them from reproduction; and second, he had given those which he selected for seed the finest possible opportunity and encouragement for individual development. Still further he continued this educational process with the children and grandchildren. In this way he secured all the benefit of his best heredity and his wonderful environment combined.

MEN ARE NOT DIFFERENT FROM WHEAT

Now, men are not different from wheat. Biologists can find very little difference either in the breeding mechanism or in the physiological processes of reproduction of wheat and of men. There are differences in detail but none in general process. Every plant which the farmer had planted in stern, austere soil had had to fight for its life. The ones that were naturally more vigorous, those that possessed a superior heredity of strength or rapidity of growth or resistance to drouth or excessive rain or cold, won out. The small grains and the weaklings never got a proper start, or if they did they were killed off. But in the warm, opulent and stimulating environment of the rich, mellow soil, all

sorts of grains survived—the good, bad and indifferent alike—and *unfortunately they also reared offspring.* In time the weak were crossed with the strong. Thus the weakness spread even to the largest and most robust specimens; the entire race became degraded, and feebleness and disease perpetuated themselves.

THE EUGENICS OF THE JUNGLE

Just so it is when men are in a state of brute savagery. Strange and contradictory as it may seem, they progress constantly in their mental, moral and physical qualities. For the jungle administers a racial discipline to man which is bound even to-day to excite the unqualified admiration and esteem of the most ardent advocate of eugenics. The weak and the witless quickly pay their debt to nature. The fool literally perishes by his own folly; the wages of sin and departure from tribal custom and morality is instant death. The beasts of the field, the birds and the insects of the air make their hourly raids and select out the less agile, the less coöperative and the less courageous. The microbial diseases take their yearly toll and leave only those who by nature lack a lethal susceptibility to these invisible and therefore mysterious enemies.

In a wonderful picture of these early days when man was beginning his long and toilsome journey from brutedom to culture, Doctor Ales Hrdlicka, our American anthropologist, says: "Humankind is the greatest accomplishment of this world. What is its meaning? . . . It had a long, laborious and difficult infancy, reaching far back into the Ice Age. What almost endless sacrifices man was obliged to make before he became sufficiently apt to cope with adver-

sities and have a sufficient surplus of progeny to enable him to multiply and to spread to the more distant parts of the earth! His progress, his evolution were hard earned, and every step was paid for to the full."

When we try to picture this helpless, naked creature in that day, and think of the long red gantlet of evolution which he has successfully run, following always the loftiest vision within him toward some unknown goal, there should certainly be no reluctance, to our imaginations, in picturing the heights of intelligence and character to which he yet may climb. Archeology and anthropology have made it a definite certainty and not a theory that man's life in that far-away time was simply a bare-handed fight against a whole universe which seemed hostile to his every step. Women who could not succeed at childbirth always died, and their offspring, who would naturally inherit this disability, perished with them. To-day we keep such women alive and save their offspring by surgical interference with nature. The halt, the maimed and the blind, instead of being invited to tribal feasts, had to rustle for themselves. Every man for himself and the devil take the hindmost, was the unmitigated law.

NO SUNDAY SCHOOL IN THE JUNGLE

When we think to-day of our feeble efforts to make men good in their natural qualities by Sunday schools, jails, prohibitions and copybook maxims, our strivings seem puny indeed compared with those gigantic and bloody methods by which nature disciplined a terrified and foolish creature into organic courage and moral health. Vice constantly purified the race, because it killed its votaries. No fatted calf was prepared for the prodigal. He starved upon the husks of his own

folly. Thieves, violators of sex morals and those who defied the tribal law were executed without chance of appeal to any higher court. The anti-social man who would not coöperate with his fellows paid the penalty of his foolhardiness and died alone. There were no sentimental women to carry flowers to the murderer, and no sentimental Governor, bidding for votes in the next election, to grant a reprieve. Nature lay in wait day and night to enter the weak spot in every man's armor and when she found it, without mercy she shot her shaft to the death. As Prof. F. C. S. Schiller, the philosopher, of Oxford, has suggested, when you see in the museum to-day the adult skull of some prehistoric human being, you may feel considerable assurance that its original inhabitant was a pretty smart man since, in the good old days of natural selection probably no fool ever lived long enough to leave an adult skull.

CIVILIZATION REVERSES NATURAL EVOLUTION

But this new thing, civilization, at once reversed—just as the rich soil did with the wheat—nearly every purifying agency which had worked such amazing benefit upon the body, the mind and the character of the savage. Particularly, under this new régime the strong, the intelligent and the sympathetic had to devote their time and energies to caring for the weak, the witless and the incompetent. The naturally civilized thus expended their energies in taking care of the naturally uncivilized and in giving them a chance to breed, the very privilege which nature had denied them in the jungle.

MORALITY BREEDS IMMORALITY

By the very process by which morality and sympathy exercise their natural functions they bred

immorality into the race. Indeed, I think it highly probable that the greatest social as well as biological disaster which civilization has worked upon man's natural constitution, especially upon his moral health, has been that it caused the man of great powers of social coöperation and rich moral emotion to take care of the man with little coöperative interest and social passion—to such an extent that the coöperative man did not have enough surplus energy left to reproduce his generous nature in an abundant brood of children, while the non-social and the non-coöperative man was by this very process especially set up in business as a going, breeding concern. It was precisely as though the glorious thoroughbreds in some famous stable were put to the plough to do the labor of the fields, while the scrubs and mongrels were kept in luxurious idleness and given the privilege of reproduction. The very softness of human sympathy and coöperativeness, which have been two of the chiefest agencies in making civilization, are also two of the chiefest agencies in breeding out the hard, robust and virile virtues. In this way gentleness keeps brutality alive, and the milk of human kindness congeals in the racial veins. If the reader has any doubt upon this point and believes that it is merely a fanciful theory, I beg him to contemplate the history of the Ishmaelite family in America as worked out by Doctor Arthur Estabrook of the Carnegie Institution. A few generations ago, down in Old Virginia, this family was composed of but two members, Old Man Ishmael and his wife, helpless, anti-social, thriftless incompetents. By the finest thing in civilization, kind-heartedness, the Ishmaelites were kept alive; not only that, they were given a better chance to reproduce their kind than the school teachers, preachers, business men, skilled mechanics, doctors and lawyers who tried to

teach their empty brains to clothe and shelter their filthy bodies and, by expensive legal procedures, prevent them from being hanged. There were two of them then; there are nearly twelve thousand now!

Perhaps until modern times this tendency of coöperativeness to breed non-coöperativeness, of social coherence to breed social incoherence, has not had extensive sway; but since the rise of humanitarianism it has been one of the outstanding features of both social and racial evolution. Social capacity is caring on an immense scale for social incapacity and giving the latter nearly all the aces in the biological deck. Human sympathy is thus steadily waging war against itself and by its own exercise is steadily weeding out its own agents. At the very least, the modern stage is set for just such a biological fiasco.

THE BIRTH OF EUGENICS

Man has come, therefore, in these burgeoning years of the twentieth century to the point where a critical examination, by the biologists, psychologists, educators and statesmen, of the natural agencies which have made him what he is—and which, if they could only be understood and controlled might make him something better than he is or than he otherwise could be—seems one of the most worthwhile as well as adventurous enterprises to which the intelligence and social capacity which he has already attained could possibly devote themselves. This is the field of hope and inquiry to which the prophetic genius of Sir Francis Galton gave the happily born name "Eugenics."

MR. CLARENCE DARROW IS ALARMED

Both the sentiment and the science of eugenics—for, fifty years after its christening, eugenics can now safely be called a science—are bound to meet with

opposition, especially from those whose biological education has been limited to a few pleasant week-ends of diverting reading in the less technical literature of the subject. Mr. Clarence Darrow, for example—who occasionally adds greatly to the gaiety of biologists by his interesting speculations on heredity in man, especially as to what heredity would be if it were something different from what biologists know very well that it is—warns us with apparently great personal alarm that any effort to improve man's natural strength, sanity and character would be a dangerous undertaking because, as he says, it would be "tinkering with the human germ-plasm."

And, in order to show that man has already reached even a higher level of intelligence and moral character than is good for him, Mr. Darrow relates that he would much prefer to have the Jukes family as his neighbors—with their charming array of murderers, thieves, pilferers and others addicted to similar forms of social diversion—than the Edwards family with their array of debaters, theologians, scientists, diplomats and college presidents, all of whom Mr. Darrow seems to view as disturbers of intellectual and social peace.

MR. DARROW'S SOCIAL PREFERENCES

To prefer the Jukeses to the Edwardses as neighbors is a perfectly natural sentiment for a criminal lawyer. The Jukes would no doubt occupy his time pleasantly both day and night. Only one drawback suggests itself. That is that Mr. Darrow might miss the cantankerous Edwardses while carrying on his favorite in- and out-door sport of debating the question, "Resolved, That Life Is Not Worth Living." I believe there is no record that any of the descendants of Max Jukes have been celebrated for

their powers of dialectic—that science as well as art of applying logical principles to discursive reasoning which Aristotle defines as "the method of arguing with probability on any given problem and of defending a tenet without inconsistency." While I can readily understand Mr. Darrow's indisposition to take up his residence in a neighborhood of Fundamentalist theologians, yet the very cantankerousness of the Edwardses to which Mr. Darrow so seriously objects might be the very thing he would need most to make life worth living among the Jukeses. Far be it from me to detract from Mr. Darrow's sources of either neighborly solace or professional activity, yet I genuinely fear that the absence of any opportunity to exercise his well known passion and skill in forensic combat, a species of dialectological endeavor in which the Edwardses have always been ready to take on all comers, would leave him at times lonesome and disconsolate, chafing like the stabled war horse when he hears the sound of the distant fray.

CIVILIZATION TINKERING WITH THE HUMAN GERM-PLASM

However, whatever may be Mr. Darrow's social and intellectual preferences, it is precisely the unfortunate circumstance that civilization is itself a gigantic and never-ending tinkering with the human germplasm which makes eugenics a superlative necessity for keeping that very civilization as a going concern.

It is a source of surprise that so obvious a thing as this should escape the notice of Mr. Darrow's robust and salubrious intelligence.

As an instance, you cannot even get up a church sociable and introduce two young persons to each other who fall in love and subsequently marry and rear a family of children endowed with certain physi-

cal, mental and tempermental characteristics—two young persons who but for your interference would have married other individuals and reared children of quite different mental, temperamental and physical traits—without tinkering with the human germ-plasm. It would seem that Mr. Darrow, with his enormous experience, would be the first to reflect that you cannot place a man on trial for his life and, by the eloquence of one lawyer hang him, or by the eloquence of another set him free to rear a brood of similar kind, without having directly and boldly done precisely what Mr. Darrow is afraid eugenics will do—namely, tinkered with the human germ-plasm.

We could multiply these examples endlessly. You cannot invent an automobile by which young people enormously extend the number of their acquaintances, without affecting the destiny of the race. For instance, when I was a boy in southern Indiana some thirty-five or forty years ago, a country lad who was acquainted with more than a dozen young women from whom to choose his wife was a far-traveled man and a gay Lothario to boot. But nowadays even a farm boy in that same region goes to a dance one night at Greensburg, twenty miles distant, the seat of the next county, another dance the following night at Columbus or Madison, neighboring county seats, and perhaps he spends Sunday with a young lady in Louisville or Indianapolis, sixty or seventy miles away.

CUPID'S ARROWS FLY FASTER AND FARTHER

For the geographical area of man's lovemaking has always been limited by the distance which he could travel after early supper, the time, as long as possible, which he would spend with his lady love, and his getting back home unobserved before daylight. Primi-

tive man had to walk. Next came the ox-cart, which did not increase the distance but gave the added thrill of a joy-ride. Next came the horse and saddle, and next the horse and buggy. To-day it is the automobile and to-morrow it will be the airplane. Perhaps when radio and the transmission of speaking likenesses have become more developed, the area of the humblest man's courtship will be the entire surface of the globe. Whether all this will enable him to make a wiser choice than Max Jukes or Richard Edwards, or than Mr. Darrow or I made—something which in our cases would probably be impossible to human intelligence—no man can say. And whether all of this is tinkering the human germ-plasm up, or tinkering it down—again, no man knows.

THE TINKERING PROCESS IS UNIVERSAL

This tinkering process which so alarms Mr. Darrow extends throughout our whole industrial, educational and political life. When we organize a department store or factory or public school or college, and place human beings under different conditions for making their living and place them under a new psychology and set up new ideals and taboos, we tinker decisively with man's organic destiny. When we vote one-third of the taxpayers' money as they do in Massachusetts, or one-fourth as they do in New York, or from one-tenth to one-fifth as they do in many other states, in order to take care of people so little adapted to civilized life that they cannot take care of themselves, we again tinker with the germinal stream.

We have always, for instance, treated the tariff in this country as though it were purely a political question. Recently, it is true, we have begun to realize vaguely that it is also an economic question, to be

settled by statistical inquiry and control. But it is likewise a very large eugenical, that is, biological question. This is because high and low tariff affect living conditions, social life, educational progress, and these in turn affect marriage rates, birth rates, home building, death rates, the development of art, of religious institutions, and of a hundred other things, all of which are powerful agencies working to change the mental and physical constitution of man.

THE MOTIVES OF MIGRATION

Just now, it seems to me, some of our candidates for doctors' degrees in our universities could render us an immense service by undertaking a large coöperative research into the motives of migration. I don't know, but I think they would find that the motives which induce the migrants to leave one country and go to another are the things which select out certain types of physique and mentality and which are very large factors in determining the tone, the temper and the tempo of the civilization in the land where they cast their new lot. I imagine they would find that in this country down to about 1850 the freedom motive was the dominant motive in selecting the types that up to that time had settled America. First the motive of religious freedom and then later the motive of political freedom—both of them highly complicated with the adventure motive—were certainly powerful agencies in the migration throughout that period. And I believe they would find that these motives and this general temper flooded all the events and gave color to the institutional life and the fundamental legal and social documents of our country. Next came the home-seeking motive which peopled the West and Northwest with a splendid home-loving type, and

which several researches have indicated brought a slightly less intelligent, although possibly a more easily civilizable population than were the early adventurers, deists, nonconformists and dissenters. Since the early eighties the job-hunting motive has probably been dominant in determining the breeds that have contributed to the blood of the nation. This motive has probably brought us far less intelligence and moral character and capacity for national development than did any of the previous contributions.

We have never even examined how much our own idealisms might be tinkering with the national germplasm and determining the inborn nature of the breeds for the happiness and development of which our national polity has been set up. Until very recently we actually advertised that we were the asylum for the oppressed of all nationalities, colors and conditions. We overlooked the fact that this might attract especially men who had allowed themselves, either from their lack of intelligence or from a peculiar type of temperament, to be oppressed by hereditary tyrants in their own land; and that men of this sort might allow—indeed, might desire—that they be equally oppressed by political bosses in their new habitat. For the newer developments in our knowledge of human personality clearly show that some men are contented and happy only when they are oppressed and dominated, provided the dominating is done by the right kind of man. There may be whole races of which this is true, and for whom such a thing as a government operated by the people is not only impossible but the surest way to unhappiness. On this point I am entirely agreed with by my friend, Dr. H. Foster Bain, Secretary of the American Institute of Mining and Metallurgical Engineers, who has had to deal with many peoples and governments. He said to

me recently that, in his judgment, for a great many peoples "the best form of government is a benevolent despotism tempered by the fear of assassination."

THE NEED OF RESEARCH

I am merely citing these examples as they come casually to my mind, not to show how much we know about the biology of man and the biological effects of civilization, but how appallingly little we know—at least how little we know that is significant. True, we know a great many isolated facts about man and his history and his nature. But in respect of any synthetized social and political concepts of biological validity, I think we are very much in the position of the village gossip. On this point, I have often been deeply impressed with the astounding number of facts which the village gossip and the man in the street carry in their heads. I have also often been equally impressed with the comparatively few facts which the scientific man carries in his head; many a scientist can tell you the work of a lifetime in a few minutes. However, the reason the gossip does not rise to intellectual effectiveness is because he cannot pick out any significant relationships among the vast number of facts which rattle about in his brain. The scientist purposely narrows his field of interest and places only a few facts under long and intensive observation. As a result of this procedure he is able finally to pick out among his few facts relationships which are highly significant and which move the mind forward to new perspectives and more effective points of view.

And, to my mind, there is to-day no profounder need in our civilization, and none that would repay larger returns for the investment of immense sums of money by our socially-minded men of wealth, than the

institution of extensive researches in these new fields of scientific adventure. I sometimes feel, indeed, that some of the money already devoted to research might be employed to more useful ends. At least, in running over a pretty large number of the dissertations offered every year in our universities by candidates for the degree of doctor of something or other I am not deeply impressed that all of them are immediately essential to social welfare or have even greatly advanced pure knowledge.

On this point President Glenn Frank, of Wisconsin University, told me recently of one graduate student who had devoted his three years of intellectual effort to a study of "The French Negatives of the Eleventh Century." This intellectual pioneer discovered that the French people had two ways of saying "no" in the eleventh century which they do not utilize to-day. Perhaps since the war these expressions of dissent have been revived, and one suspects that a number of new ones have been invented. President Frank also called my attention to Stephen Leacock's penetrating statement that a great many candidates for doctors' degrees "spend three years studying a frog's hind leg or the first thirty minutes of the Reformation."

However, we dare not make light of any thoughtful investigation, even though we cannot see that it has added any immediate fruit to the tree of knowledge. Personally, I strongly agree with Prof. William Wheeler of Harvard, our best man on ants, who said in effect recently, that he would be willing to lock a research student up in a room for three years and feed and water him through a hole in the wall in order that he might devote all his mental energies without distraction to a study of the fourth cell from the end of the caudal appendage of the embryo of the chipmunk. Such research should by all means be fostered,

since there is never any telling what may come out of pure knowledge, even though it emanate from the end of an embryonic chipmunk's tail.

But if any research student is looking for fruitful themes of a more immediately practical nature for his doctor's dissertation, he will surely find them galore in the field of eugenics, because the question, Where is all this tinkering with man's biological constitution carrying him as an organic being? is still in the field of apprehension and theory. As mere samples of problems upon which the need of new light is very urgent, the following are a few which at this moment come floating through my mind:

SOME EUGENICAL QUESTIONS

What are the effects of child-labor legislation upon the birth rate?

What are the marriage ideals of college students?

Is lovemaking subject to education?

What will be the effects of birth control?

Does medical science chiefly prolong the reproductive period of the weak, and thus lead toward racial deterioration?

Do orphans and adopted children tend to resemble their foster parents or their real parents the more?

Is our industrial life developing mental and temperamental types in our population?

Are we developing mechanical types, commercial types, professional types, and the like?

What are the economic and biological origins of genius?

What are the relationships of heredity and environment?

How high is the correlation between intellect and moral character, between beauty and brains, between parental instinct and intelligence, and how high is the correlation between all of these and health and longevity?

What could be learned about the causes that have made history, by the application of statistical and biometrical methods of study?

By a few moments' reflection I could easily list a hundred other questions, the answers to which are indispensable to any sound eugenical program. I mentioned the last question above, referring to a study of historical causation, for the simple reason that a student of exact scientific method gains very little knowledge from reading most of the histories so far written. True, he fills his head with a great many facts, but both he and the author are very little better off than the village gossip in being able to pick out any significant causal relations among these facts. As an example, one rises from a perusal of Oswald Spengler's ponderous and much-heralded volume, the *Decline of the West* with a feeling that neither the reader nor the author knows very much more than he did before as to whether the "West" is going down or going up. The author evidently picks out the instances that support his own theory. He institutes no comparative method among *all the instances* both for and against his theory, which would enable us really to tell whether there is any common, continuous thread of causation that runs through them all. Indeed, I have the impression that if we could really get at the causal relationships among the facts covering any ten-year period of human history, and really know why during those ten years men and nations behaved as they did, it would be of more eugenical value in tell-

ing us how to proceed with a social program that would elevate man in his inborn nature than at least ninety per cent. of the four hundred thousand volumes said to have been written on human history.

ALL QUESTIONS ARE EUGENICAL QUESTIONS

These suggestions, while frankly intended to be merely argumentative and in no sense comparative, I think nevertheless throw into clear relief the fact that practically all questions are eugenical questions, all happenings are eugenical happenings. Indeed, the biologist believes, in my opinion, that there is scarcely a breeze that blows, scarcely a sun that rises or sets, and scarcely a star that shines on the human pathway, that does not somehow affect the mental and physical constitution of every living thing, including man. If those who doubt the truth of evolution could only live ever so briefly in contemplation of the beating, pulsing, throbbing thing we call life, they would never again believe that life itself could possibly be a static thing, but must from its own nature be a manifestation of ceaseless evolution, weaving itself by its own dynamics into ever-new forms of virtue and beauty and working toward goals larger than its own immediate being.

And until men come to accept evolution as the central fact in their own world wisdom and outlook, there is very little use, I think, in talking to them about measures for elevating their own evolutionary status—the measures which we call eugenics.

OBJECTIONS TO EVOLUTION

To my own mind, one of the chief obstacles to the popular acceptance of the fact of evolution—a fact which seems so perfectly obvious to a biologist—has been the failure of the biologists themselves to answer

the question which the average man justly advances; namely, that he cannot see how one species can possibly change into another, since he has never seen such a thing take place. The late Mr. Bryan was deeply troubled on this point. Owing to the simplicity of his mind, demonstrated by his childlike, lifelong inability to draw logical general conclusions from any set of facts, he constantly demanded that the biologists show him examples of one species changing into something else. As Professor Conklin, of Princeton, pointed out, Mr. Bryan demanded that the biologists should oblige him by changing a monkey or an ass into a man while he waited. This could not be done on such short notice, although Professor Conklin suggested that Mr. Bryan had often witnessed the reverse of this process.

As a simple matter of fact, evolution does not transform dogs into horses, and man has not evolved from a monkey. These things do not take place in evolution and never have taken place. It is largely the fault of the biologists that the average man supposes that there are an enormous number of separate, distinct, unit species of plants and animals, unchangeable in themselves. It is perfectly natural that he cannot see how, if these discrete separate species exist, they can yet somehow be changed into each other. Dogs and horses, monkeys and men, do not seem to him to be the same sorts of creatures, and he cannot explain to his own mind the "leap" from one species to the other. It is no wonder that he does not readily swallow such a conception unless he can see it backed up by actual experiments.

EVOLUTION FOR EVERYBODY

On this point I urge the layman to read the clear and simple account of what the theory of evolution

really is and why scientific men believe it is true, which Mr. Henshaw Ward has recently given us in his enchanting book entitled *Evolution for John Doe.* As the biologist sees nature *there are no such things as species* in the sense in which the word "species" is used in popular speech. There is in reality only one species of plant and animal life in the world, and that species is simply organic life itself. Pine trees, for example, do not "evolve into" corn, nor do thistles "evolve into" figs. True, if one studies pine trees he notes that there seem to be many different kinds; but he also finds as he goes back into finer and finer differences among pines that he comes to a point where he cannot himself tell where to place these differences, whether in this species or that. He comes to a point where his pines merge into other conifers and conifers merge into other types of trees and these into still others; and as he goes further and further into his problem he at last comes to a point where he cannot tell whether the thing he is studying should be called a plant or an animal. When he reaches this stage he realizes that an animal is merely what he and his colleagues decide to call an animal, and a plant is merely what they decide to call a plant. He then sees, as Mr. Ward has finely expressed it, that "a species is a mere opinion."

Of course, when two phases or types of life have gone on for a long time, each weaving itself, by the evolutionary urge within and the forces of the environment without, into new and more remote patterns from the common parent stem, there comes a time when the stupidest intelligence can say that one is a bear and the other is a hippopotamus. When two kinds of life have traveled a long, long way, each on its own evolutionary path, as bear and hippopotamus and monkey and man have done, the man in the street is

perfectly justified in believing that they cannot "leap" across from one path to the other. Neither can they go back around by way of the original starting point and join each other. But the biologist has collected sufficient evidence as he has picked up the bones and fossils of many kinds of life and has traced them back, each along its own pathway, to make him believe that all these forms did have a common starting point. He believes this because as his mind goes back and back along the route of differentiation he finds the differences becoming less and less; and just because he believes the universe is a logical thing he sees no escape except to believe that these differences would finally entirely disappear and the many forms of life merge into one.

WHERE EVOLUTION TAKES PLACE

Mr. Bryan did not know these things, or if he did he lacked the mental power to see them as a logical whole. The universe, to Mr. Bryan, was a piecemeal affair and not a grand and inspiring unitary and never-ending process. Mr. Bryan did not even know that evolution takes place very little if at all, in the bodies of plants and animals but in the eggs and sperms—that is, the germ-cells. Indeed, evolution probably all takes place not in the germ-cell as a whole but in the hereditary units called "genes" (pronounced "jeans") inside the germ-cell. Morgan and his students, and Jennings, Muller, Blakesley and many others have adduced evidence that these genes are themselves subject to change. And if these genes can be proved to change and if they can be shown to be the chemical units which develop into the visible characters and traits of plants and animals, why, then, the case for evolution is absolutely won. Edu-

cated men can no longer debate the question, even though we never found the fossil remains or the bones of a single plant or animal that formerly existed on the earth.

For if there are in the egg of a hen, for instance, certain physical bodies (that is, genes) which are the original cause of her later exhibiting in her body, let us say, black feathers or a red comb; and if we can prove that these original genes undergo change, either from some inner urge or from some outer influence, it is obvious that the hen herself will undergo change. And if this change is inherited, then there has come a *real* change in this species of hen. A new species of hen *is* evolving. And when these changes have become numerous enough the hen would easily be described both by scientists and by the common man as being some other kind of animal.

Evidence is constantly accumulating to indicate that these genes do change, and that is in reality all an educated man needs to make him believe that he is living in an evolutionary world—that he is himself a part of a great life process working toward ends beyond his ken. Evolution needs no other evidence, although there is a vast body of quite other evidence of the truth of evolution, overwhelming in volume and constantly growing in coherence and logical cogency. The problem of the "missing link" no longer troubles the scientific mind, and, indeed, need not trouble the common man. There are a thousand missing links. The biologist cares little about that. If for example, a man coming through the forest should find a single link of a chain and then a little farther on should find another; if he should go down across the valley, and upon the next hillside should find several others, and on the opposite side of the hill still others, all of the same character and all trending in the same general

direction, surely he would be a dull wit indeed if he did not conclude that they had at one time been continuous, linked together in one common chain.

So it is with evolution. And until we can convince the common man of the *fact* of evolution, make him feel it as the very breath of his daily life and feel that he is himself a part of a growing, developing, evolving species of being, I fear we cannot convince him of the profound ethical and religious significance of the thing we call eugenics. For eugenics must lay hold of men's moral emotions, appeal to their æsthetic senses, enter into their art, their education, their literature, and must form one of the great sources of religious inspiration, or else men will not act from eugenical considerations in devising social undertakings or building their political institutions.

PROHIBITION IS ABOVE ALL A EUGENICAL QUESTION

As a concrete illustration of how important it is to induce men in general to appreciate the fact and the meaning of evolution and to apply all science to their social undertakings, let us for a moment consider two of the greatest problems of our time, prohibition and tuberculosis. We have handled the latter almost entirely as if it were merely a problem of bringing health and comfort to the individual, and we have looked upon the former almost entirely as a moral problem. True, the use of alcohol has of late been considered as a problem of personal health; but personal health in this instance has been looked upon almost altogether from the standpoint of moral obligation. It is a curious thing, that to breathe fresh air and to eat food with the proper amount of iron or vitamins in it, and the like, does not appeal to the average man as a moral obligation. But it seems very easy to appeal to him to refrain from alcohol, not be-

cause alcohol puts his stomach or his liver out of order, but because if he does upset his stomach and liver with it, and it gives him a little pleasure besides, it is a gross moral sin. If, however, his stomach and liver are thrown into just as bad a condition from lack of iron or vitamins this does not appear to him as a moral sin, but as a question of comfort and efficiency.

As a simple matter of fact, one duty is just as profound morally as the other, and neither will ever be seen in its larger meanings until man sees that the real moral sanction that lies behind his every act is not only its immediate effect upon his personal happiness and his social institutions but its ultimate effect upon the race at large. The prime thing about prohibition has been that men rushed into a vast program which, for all we know, might wreck the very course of human evolution, without ever setting their scientists at work to find out what has been and what may be the effect of either alcohol or the absence of alcohol on the natural character and constitution of human beings. No one really knows to-day whether the drinking of alcohol by a parent really affects his offspring or not. But, certainly, what evidence we have practically all tends toward the conviction that alcohol has been an agent—possibly a very considerable agent—in improving man both in his physical constitution and in his intelligence and moral character.

ALCOHOL PROBABLY AN AGENT OF RACE IMPROVEMENT

When the old prophets said, "The fool shall perish by his own folly," they probably had been impressed with the fact that a great many weak and foolish individuals drank themselves to death. Had they reflected a little further, it might have occurred to

them that nothing better could have happened for the race, especially if the alcohol carried the foolish persons off before they had any children. All life insurance records to date agree with the findings of the prophets; namely, that heavy drinking shortens the lives of the drinkers. A very great part of the prohibition urge has been roused by the insistent plea of its advocates that all drinking, however moderate, shortens life. For two or three generations our American youth have been frightened by tract, orator and pulpiteer with lurid statements to the effect that drinking a glass of beer or a teaspoonful of alcohol would lead to a much earlier death of the individual who embarked on so suicidal an enterprise. We have also had almost equally lurid pictures of the frightful degeneracy which even the smallest doses of alcohol taken by the parent set up in the offspring. One of the most powerful orators of the prohibition cause, the late Governor J. Frank Hanly, of Indiana, used to draw upon the platform an impressive word picture of an immense procession of degenerates. He had all the insane, the imbeciles, the cripples, the criminals and the moral degenerates and defectives march by in vast cohorts from the beginning of time down to the present day. The picture was indeed terrifying—and all of this wreckage of human life was, in Governor Hanly's judgment, due to just one great, murderous cause, ALCOHOL!

All of this same tragic story has been repeated in a thousand different forms, especially to the American people, in face of the fact that there does not exist today in any laboratory of the world conclusive evidence that the drinking of alcohol by a human parent, whether in large or in small quantities, ever set up in any direct way the slightest defect of any sort in the offspring.

Another powerful orator of prohibition has been Captain Richmond P. Hobson, whose speech in Congress on alcohol was sent out in enormous quantities to the American people, apparently at public expense. Captain Hobson, one of the most delightful men personally whom I know, has repeated this speech as a public lecture thousands of times before audiences all over America. It is reasonable to suppose that this address has really been a potent agent in inducing the American people to adopt prohibition as an integral part of their national life. I have never heard the address, but it was recently furnished to me in printed form from the *Congressional Record,* by one of the advocates of prohibition in Congress. I did not even read all of the address, but I read it for thirty minutes, and during that time marked twenty-three scientific errors, which, I think, ninety-nine per cent. of the biologists of our time would agree were errors.

ALCOHOL DOES NOT CAUSE DEGENERACY

As another illustration, let me cite the statement of one of the leading prohibition advocates of America, who said to me recently that there was "ample proof" that alcohol caused degeneracy in the race. The "ample proof," he said, was the fact that in Bavaria, where there is the highest per capita consumption of alcohol in the world, there is also the highest percentage of imbeciles in the population. I replied that if examination were made it might also be found that there were more geniuses in Bavaria or more bald-headed persons than anywhere else. I also pointed out that there was probably more wienerwurst, known in America as "hot dogs," consumed in Bavaria than in any other region of the earth, and that I had never heard that wienerwurst was causing the human race to

degenerate. His only reply was that he could not accept my suggestions, as this "well known fact" that the enormous amount of Bavarian feeblemindedness was due to excessive drinking habits was "a part of the Bible of Prohibition." It may be, but if so, it is biblical and not experimental or statistical biology.

I am not pleading against prohibition or for prohibition, as I do not know whether it is a good thing or a bad thing. I only know that I shall not vote such a vast program to impose changes upon the fundamental habits of mankind so long as I do not know any more than I know now, or than anybody knows, as to what it is going to do to the human family. The most hard-headed biologist is bound to respect the vast moral passion that lies behind prohibition. It probably does not need exact scientific determinations, nor any prolonged experimental or statistical investigations to prove that *something should be done* about alcohol; some sort of measures should be undertaken to lessen the obvious, undebatable misery which the unlimited use of alcohol brings upon certain individuals and their families. But another curious thing of prohibition is that it has never yet investigated whether or not alcohol is a *universal* human curse or a curse to only a *limited number* of human beings, endowed by *nature* with a peculiar temperament and physical constitution. Evidence is constantly accumulating to indicate, at least, that alcohol is a curse only to a small portion—nobody knows whether it is five or twenty per cent.—of the human race. It is growing in probability that alcohol is taken in excess, and therefore becomes a problem of public health and morals, only by persons who are psychopathic whether they drink or not. If this should turn out to be true, and I don't know whether it will or not, and if the other eighty or ninety or ninety-five per cent. of the population should find

alcohol a real blessing to their lives and of no injury to their health, it certainly makes it obvious that prohibition is substituting political remedies for medical remedies, policemen's clubs for moral suasion, and jails for education.

MODERATE DRINKING DOES NOT SHORTEN LIFE

Now, as to whether alcohol shortens human life we have really only one critical investigation, that of Raymond Pearl of Johns Hopkins University, the report of which has just come from the press. Pearl has, for the first time, investigated by critical procedures the question whether moderate drinkers of alcohol land in their graves earlier than those who are total abstainers. I cannot go into Pearl's statistical methods, which are impressive in their extent and are conducted according to the latest methods of analytical inquiry, but I strongly recommend a wide reading by the general public of his admirable book entitled, *Alcohol and Longevity*. It may be that when Pearl's pioneer work there published has run the long gantlet of scientific criticism some corrections in his figures may be found necessary. On this point I do not pretend to pronounce judgment. But that it would form a sounder basis for political procedure, for social welfare and moral uplift than the methods used in concocting the aforementioned "Bible of Prohibition" and the method of calculating the amount of weak mindedness in the population from the amount of alcohol consumed per capita per annum, I have not a shadow of a doubt.

And as to the effect of the drinking of parents upon the health, character and longevity of the offspring,—that is, the effect of alcohol on the human race en masse, as well as to its effect upon the health and

longevity of the individual,—I prefer, in order that I may not be accused of reading my own conclusions into such a piece of scientific work, to quote Pearl's conclusions in his own words. They are as follows:

"The results of the investigation which this book reports can be stated in much less time and space than the work itself required. They are:

"1. In a fairly large and homogeneous sample of the working class population of Baltimore the moderate drinking of alcoholic beverages did not shorten life. On the contrary, moderate steady drinkers exhibited somewhat lower rates of mortality and greater expectation of life than did abstainers. This superiority is not great in the male moderate drinkers, and may not be significant statistically. But it certainly gives no support to the almost universal belief that alcohol always shortens life, even in moderate quantities.

"2. Those persons in this experience who were heavy drinkers of alcoholic beverages exhibited considerably increased rates of mortality and diminished longevity, as compared with abstainers or moderate drinkers.

"3. If both moderate drinkers and heavy drinkers in this sample of the population are pooled together, and the resulting heterogeneous group is compared with abstainers, the drinkers, as a class, have higher rates of mortality and lower expectation of life than the abstainers as a class. The result is in agreement with the experience of life insurance companies. But it is fully demonstrated in this book that this result appears only because the impaired heavy drinker risks are pooled with the actuarially superior moderate drinkers, and bring down the resulting pooled average.

"4. Experiments by various workers on such different forms of life as guinea pigs, fowls, rats, mice,

rabbits, frogs and insects agree in showing a beneficial effect of alcohol upon the race. This beneficial effect appears to be produced chiefly as a result of the remarkably sharp and precise selective action of this agent upon germ cells and developing embryos, killing off the weak and defective and leaving the strong and sound to survive and perpetuate the race. The prevalent notion that parental alcoholism tends to cause the production of weak, defective, or monstrous progeny is not supported by the extensive body of experimental work which has been done on the problem. Only one recent, critical experimenter has ever reported the production of defective offspring following parental alcoholism, and his results respecting this point are definitely *not* confirmed by another competent worker with the same animal, the guinea pig.

"It seems clear, and entirely just, that anyone disagreeing with the conclusion reached in this study that there is no impairment of the life duration of moderate drinkers as compared with abstainers, must assume the burden of proof as to why the present considerable mass of objective data do not show a result opposite in sense to that which they do in fact show regarding this point. I am in no way constrained to explain why moderate drinkers and abstainers show similar life expectancies at all ages. I am content to rest upon the fact that it is so in the present statistics. On the principle of Occam's razor (*Entia non sunt multiplicanda praeter necessitatem*), the most probable explanation seems to me to be the simple one that the moderate consumption of alcoholic beverages has no deleterious effects. But since I have carefully refrained throughout the book from stating this as a *general* conclusion, I am in no wise obligated to prove it as such. Instead it is sufficient for the present

merely to draw the specific conclusion that in the considerable sample of the working class population of Baltimore here studied, moderate drinkers did live, on the average, just as long as total abstainers, and in truth a little longer.

"These, then, are the results of this investigation. They seem to indicate, with great clearness, that any biological harmfulness chargeable against alcohol, in this group of over five thousand people, resulted solely from its abuse, and not from its reasonable and proper use. I said at the beginning of this book that the sole object of the study was to learn something about the purely biological effects of alcohol, as distinguished from its real or supposed social effects."

THE NEW METHOD OF BIOLOGICAL POLITICS

I hold no brief for the correctness or incorrectness of Doctor Pearl's work. This must stand or fall by the judgment of men more intimately qualified in this particular field than I. But that Pearl's work is a fine example of the political and social methods upon which sound national life and sound social and political ethics must proceed in order to usher in and carry on the next great age of man, I have not the slightest doubt. Until men appreciate the vast moral ministry of statistics and experiment in determining both their private and public conduct I cannot see civilization as anything but a vast mêlèe of tumbling human impulses, very little under the guidance of intelligence, and likely to go to pieces any moment by one route about as easily as by another. We hear it now loudly acclaimed that civilization is in danger. Civilization is always in danger. It always will be. But it will be in danger just in proportion as it is guided by emotion instead of intelligence.

Whether one favors prohibition or is against it is, in my judgment, a profound indication of his whole outlook upon life. It depends upon whether he takes a positive or a negative view of moral liberty and self-control. In thinking upon prohibition there is a story which often comes to my mind that illustrates the difference between the two points of view:

The story runs that about two hundred and fifty years ago, over in Holland, there was an obscure lens grinder who lived and died in a little poorly furnished room, almost friendless, penniless and alone.

After his death they found a bundle of manuscript in the drawer under his work-bench. By chance, some scholars happened to see this manuscript and instantly discovered that this simple, unpretending craftsman, named Benedict Spinoza, had written one of the greatest philosophies of life in the whole history of mankind.

In the course of that philosophy he said: "If you can keep from doing a thing because it is bad, you can keep from doing the same thing because something else is good."

That is the difference between the commandments which say, "Thou shalt not," and what, according to St. Mark, are the greatest of all: "Thou shalt love the Lord thy God" and "Thou shalt love thy neighbor as thyself."

In the political world, it is the difference between Roosevelt and Wayne Wheeler, between Abraham Lincoln and "Bill" Anderson.

We live in an age of negatives—an age when well-intentioned people hold the idea that men can be made virtuous by locking them away from temptation.

The chief aim of our Constitution—formed by men who were all positives—was to prevent the Government from doing something to the people. They were justly afraid of the power of Government. But the

whole passion of our time is to use the power of Government to do something to the citizen—to prohibit him from living his own life of moral freedom.

Thousands of laws are passed to prohibit the citizen; we hear of no laws to give him more liberty.

Our fathers died for liberty and we are afraid of it.

Our fathers believed in education and the positive power of moral ideals; we believe in prohibition and the negative power of policemen's clubs.

I am personally opposed to prohibition for four very simple and, I think, very godly reasons: because I believe in temperance, morality, liberty, and in law and order.

I am convinced there is more rejoicing in heaven over one free moral act than over ninety and nine due to prohibitions.

Even if we attain national sobriety by jails, clubs, fines and police, it will be the moral tragedy of all history; if we attain it, as we can, by education, it will be the greatest glory that men know, the glory of self-control.

What this age needs most is to hark back to its great philosophers and moral leaders. They were *all* positives.

Prohibition may succeed in keeping men from drunkenness, but it will never give a single man self-control.

They did succeed in prohibiting Socrates from teaching moral liberty and forced him to drink poison; and, "in that one cup of hemlock, they drowned a whole civilization."

This negative psychology seems to me to be the one great danger to the future liberties of men.

If we can keep from drunkenness and immorality of all sorts because they are bad, we can likewise keep from these negative things by the positive teaching to

our children that temperance, morality, liberty, and law and order are fine and beautiful, great and good.

Notwithstanding the considerations I have advanced, however, the great moral passion that has caused millions of men to vote a restraint upon their own liberties and happiness in order to protect a weak brother from the consequences of his own probable folly, is one of the most inspiring spectacles in the whole history of mankind. Not only inspiring, but hopeful, even to the man who disagrees with its immediate wisdom. It shows what a vast reservoir of the milk of human kindness is ready to be let loose as soon as the scientist and the social technician have themselves developed the knowledge for directing it into more effective channels. The revelation that such great numbers of people want to make the world better, cleaner and happier is so inspiring that it almost reconciles one to accept without protest the unlooked for ill effects that have flowed from prohibition.

I think that prohibition is fundamentally a great social, political and biological mistake, but the great urge for human betterment behind it all is not a mistake. It is one of the most precious revelations of human nature. In the same way, I think, democracy in its extreme form is an unworkable hypothesis, but the sentiment of democracy is one of the most priceless passions in the human heart. Aristocracy in its extreme form is just as unworkable as a scheme for developing universal happiness or increasing the world's fitness for affairs. But the passion for excellence which lies behind it is too valuable not to be utilized somehow in the ultimate scheme of government which, by and by, technical knowledge applied to the guidance of human passions will give to the next age of man.

If it be really true—and I suspect it is—that men

drink to excess because of mental and temperamental instability; if further, this type of instability is present in only a small portion of the population; if this instability tends to be inherited by the offspring of such persons, as all evidence indicates is highly probable; if, moreover, as Pearl's memoir indicates, all the vast preachments of the past two generations and all the efforts at prohibition combined, have caused only a small percentage of heavy drinkers ever to reform (probably less than five per cent.), it would surely indicate to human reason that some other method of attack upon what everyone admits is a great national problem should at least be tried.

If I may venture a personal judgment, I cannot but feel that if one fiftieth of the money expended on efforts at prohibition could be expended for an extension of the new science of clinical psychology, so that every community of a thousand persons or more should have at its service a consulting psychologist, just as it now has a consulting physician, it would do more to solve the question of alcohol, in so far as it is a social and personal problem, than all the measures of prohibition combined. It seems to me that the penetration by a skilled technical expert, who had spent years in training for his profession, into the inner life of the individual drinker, a study of his spiritual conflicts and the harrowing problems of life as he sees it, would offer more hopes of the building of a sound character and of a development of a will to resist temptation than can be done by airplanes or rum fleets.

PSYCHOLOGY CAN CURE DRUNKARDS AND CRIMINALS

When the psychologist is privileged to extend his ministrations far down into the pre-school life of the child, even down to the hour of birth of each babe, and

then extend his services not only through the usual educational period but on into industrial and vocational adjustment; when he is even privileged to extend his skilled and kindly ministry into a man's domestic life and into the home wherever there is lack of mental and temperamental harmony, I think that we shall have made the greatest step which men have ever made toward a real solution of the problems both of alcohol and of crime.

One curious thing that has escaped all but a very few students of such matters is the obvious fact that all criminals and all pathological drinkers were at one time children. And I believe the work of Terman, Raubenheimer, Cady, Hazlett, Starbuck, May and Voelker has given us abundant reason to believe that the potential criminal can be detected when he is a little child. Voelker, Starbuck and others are giving us every reason to believe that moral education is more effective than intellectual education. Psychologists are just giving us reason to believe that we can educate human character more than we can educate human intelligence or, rather, that we can so train the intelligence that it will guide the emotions to a sound and happy life of effective social behavior.

WHY PROHIBITION WILL NOT WORK

It is my belief in moral as well as intellectual education that gives me my strongest hope for eugenics. It gives me the hope that men will in time institute a biological policy as big and as insistent, as imperative in its ethical demands and as lofty in its calls to men's inner drives, as are the appeals that come from the more tangible rewards of civilization. After all, civilization is not an artificial creation but a natural development. It is simply a fulfillment of or-

ganic function. Indeed, civilization is the outcome of man's fundamental trends; and chief among these trends—I shall not venture in this day to call them instincts—are hunger, the sex emotions, the æsthetic senses and the desire to be important. Civilization gives more prizes to these natural functions than does the jungle, and that is chiefly why we try to be civilized. But when a society becomes as complex as ours, these trends must be more and more subjected to control, not only by the individual himself but by the best trained technical intelligence which the race can attain and institute. And for these reasons, just because man is so little rational and so much emotional, just because he will be a damn fool if he gets half a chance, I do not see the slightest hope of prohibitions and policemen's clubs curing him of such a vast trend in his nature as his desire to relax the tensions of his own life and seek either a real or a fictitious freedom in alcohol.

ALCOHOL IN HISTORY

All of this mêlée of noble impulses guided by ignorance instead of by intelligence shows what a dangerous biological enterprise civilization really is. It shows us in a very definite way how man's loftiest passions may be at war with his health and character as a race. I merely cite prohibition as a prime example. It is highly probable that the American people, prior to prohibition, were rapidly drinking themselves sober. Those family strains that were highly susceptible to alcohol and could not control their appetites for its excessive use were probably rapidly weeding themselves out. Prof. Edward A. Ross, the distinguished sociologist of the University of Wisconsin, suggested years ago that possibly within another hundred years these biologically defective strains would

have probably been mostly weeded out. He suggested that if this should prove true, probably prohibition would never become a question at all.

Whatever may be the underlying cause at work, it seems pretty obvious that those races such as the Jews and Mediterranean peoples which have used alcohol for the greatest number of centuries have the fewest of these uncontrollable drinkers. Drunkenness is as rare among the Jews as it is common among the north European stocks. Prof. William MacDougall, psychologist, of Harvard, argues that this is not because alcohol has weeded out the weaker-willed strains from the south European peoples, but because they are a gayer and more light-hearted people; while we grim and gloomy folk, such as the Scotch, East English, Swedes, North Germans and the like, are of a dour and somber disposition and prone to take life as a dismal and solemn proposition. He adduces considerable evidence from the character of the art, the philosophy and the literature of the two groups of peoples, and the remarkable differences in their relative tendency to commit suicide, that the Northerners are introvert and the Southerners extravert. The Northerner, he thinks, likes to get off by himself, to roam the sea, to climb the lonely mountain fastness, to explore the wilderness, and to commune with his soul upon problems of religion, destiny and God. The Southerner makes of his religion a gala festival and has a good time in carrying on his worship. MacDougall thinks that for this reason the Northerner has to drink to keep up his courage in the face of the awful problems of existence. It seems a bit anomalous that a man would have to drink to keep up his courage in the presence of his God, upon whom he is relying for counsel and consolation. We might reflect that the Jewish people were apparently not an extremely drunken race when communion with a rather

terrifying Jehovah was the very atmosphere which they breathed.

PROHIBITION PUT OVER BY THE TOWN DRUNKARD

Of course, these passing considerations of mine do not really answer the arguments in Professor MacDougall's penetrating thesis. It may be that both the introspective factor and the heredity factor are at work to cause more uncontrollable drinking among the Northern races. However that may be, I can but think that the town drunkard was one of the very chiefest agents in causing our noble-hearted people to try to remedy his misfortune by prohibiting alcohol to the entire population. Certainly the reformed drinkers, from John B. Gough and "Billy" Sunday down, have been among the strongest propagandists of the cause. I hardly think that the judgment of such men as to the best measures for their own moral protection would be as wise and valid as could be gained from large, prolonged and dispassionate researches. It seems to me that a strong case might be made out to the effect that prohibition was "put over" on the American people chiefly by second-class men. Most certainly, it was "put over" without first-class sociological, biological, psychological and political knowledge. We do not find among the leaders of prohibition propaganda such men as, for examples, President Eliot, President Lowell, President C. C. Little, President Glenn Frank, Elihu Root, Chief Justice Taft, John W. Davis, Edward L. Thorndike, Prof. Franklin H. Giddings, Prof. John Dewey, James Harvey Robinson, Everett Dean Martin, Dr. Irwin Edman, Owen D. Young, Dr. William H. Welch, Thomas Hunt Morgan, and men of similar intellectual caliber and broad social outlook. Nor do we find our leading writers, philosophers and drama-

tists among the leaders in this field of social and political appeal. Some of these men may have accepted prohibition but they have not been leaders in making it a national policy. Wisdom comes only from wise heads, and if a proposed measure of national life so important as this does not appeal to heads like these, I have little confidence in trusting in its ultimate soundness.

TUBERCULOSIS IS PARTLY HEREDITARY

All I have said about the failure of men to see prohibition as a biological problem, a problem of human evolution, as well as a social and political problem, applies to numerous questions, such as crime, prostitution, charity and uplift, and even medical science itself. As another example of this, we unhesitatingly spend vast sums of money to try to cure those afflicted with tuberculosis. Only a few persons, even in the medical profession, have ever stopped to inquire whether everybody was equally likely to have tuberculosis in a severe form, nor have they asked whether, if some persons are more likely to contract it than others, is not that greater likelihood transmitted to their children?

After millions of money had been spent for curing tuberculosis in the individual, two or three biologists sounded a warning that if these persons were cured and then allowed to marry and transmit to their children their likelihood to contract tuberculosis, and these on to the grandchildren, and so on, it might spread tubercular susceptibility throughout the whole race. They suggested that curing the individual and allowing him to produce children would in the end increase the disease in the race. It is my own belief that this is what is happening. This situation led the

American Tuberculosis Association, to its lasting credit, to institute extended research under the direction of Dr. Raymond Pearl, to whom previous reference has been made, to ascertain, if possible, how much of tuberculosis is due to heredity and how much to environment.

If susceptibility to tuberculosis be a thing such as susceptibility to mathematical training, and if it be due largely to heredity, then one sort of policy is indicated; and if it be due largely to environment and heredity plays little part, then another policy is indicated. But we have expended vast sums of money on the cure to tuberculosis, on the theory that it was entirely due to environment. This theory means that if we can cure the individual there is no more danger of his children contracting tuberculosis than the children of any other person. The mere fact that a much higher percentage of tubercular young men was discovered among the army draftees in southern California, Arizona and New Mexico, than among those from any other place in the country, would indicate of itself that their parents and grandparents had probably been cured by those wonderful climates, but had intermarried susceptible stocks to such an extent that tuberculosis was becoming a characteristic of the race. Pearl's investigation is not yet completed, but it has gone far enough to indicate that the heredity factor in tuberculosis is a very considerable one. It has certainly gone far enough to show that those who maintain that heredity plays no part in tuberculosis and that all persons are equally likely to contract the disease, provided they are equally exposed to it, will not only have to prove their case and not assume it, as heretofore, but will have to prove it by much more exact methods than they have so far instituted.

HEREDITY OF TUBERCULOSIS OPTIMISTIC

It will be an extremely fortunate thing if it should turn out that such things as tuberculosis, cancer, insanity, criminalistic tendencies, and the like, are inherited; and the more strongly we find they are inherited the more fortunate it will be. I shall argue this question at much greater length in a subsequent volume, which I have under way in my workshop, on "The Optimisms of Science." It is certainly one of the crowning optimisms of all scientific discovery that we are not all equally likely to contract tuberculosis, develop cancer, exhibit insanity or commit crime.

Indeed, the naïve methods which most of our books on criminology have taken to prove that heredity is not a factor in crime, by citing a large number of criminals whose parents and grandparents and even great grandparents were not criminals, give a student a new conception of what constitutes sound biological inquiry. Some investigations in this field may have escaped me, but I have never seen one outside of the magnificent work of Charles Goring, of London, which even took account of so obvious a fact that some of the persons in the family pedigree may have died in infancy. Babies do not commit crimes, but what they might have committed had they grown up no mortal knows. And when so obvious a fact is not somehow accounted for in the statistical array, the investigation is practically worthless. This fallacy has vitiated many of the investigations of the heredity of cancer, since in most of them no account is taken of the fact that cancer does not set in very often before the age of thirty-five; and if a person die prior to that age in the pedigree by disease or accident, there is no telling how he would have affected the result had he lived into the cancer age. The admirable researches of Miss

Maude Slye, of the University of Chicago, strongly indicate that there is a high hereditary factor in cancer. Her researches are models of sound biological inquiry. The happy thing is, however, that all studies are steadily trending toward the conclusion that human defects and human virtues are partly due to heredity. It is this which gives hope to eugenics and also to the human race.

DO SANITARIUMS CURE TUBERCULOSIS?

As a matter of fact scarcely any recent public welfare policy has given us a more striking proof of the necessity of first looking before we leap, than the investigation, by Doctors Stocks and Karn, of the sanitarium treatment of tuberculosis. Their conclusions have just been published in Volume I of the *Annals of Eugenics.*

Stocks and Karn are two English investigators working in connection with the Galton Eugenics Laboratory, under the auspices of the University of London. This laboratory is under the direction of Prof. Karl Pearson, who is regarded, by many of those competent to judge such matters, as the foremost statistician in the world. The laboratory is carried on largely by funds left by Sir Francis Galton, one of the greatest minds of all time and the founder of the science of eugenics. Galton took the science of statistics, which had been invented by a Belgian mathematician named Quételet, and greatly elaborated its methods in range and precision. I often wish that every high school and college student would hang above his bed, as the first thing to greet his eyes in the morning when he wakens, along with the vision that is uppermost in his mind that he must smash through the line at the next football game, the

motto which was the inspiration of Galton's life. Galton left his impress upon all modern science, and his agile mind and noble spirit touched nearly every field of human inquiry. I can, therefore, recommend to the youth of our day no finer statement than this of the spirit and method which should guide him, and not only in his own scientific research, but in the development of his social philosophy:

"General impressions are never to be trusted. Unfortunately, when they are of long standing they become fixed rules of life and assume a prescriptive right not to be questioned. Consequently, those who are not accustomed to original inquiry entertain a hatred and a horror of statistics. They cannot endure the idea of submitting their sacred impressions to cold-blooded verification. But it is the triumph of scientific men to rise superior to such superstitions, to desire tests by which the value of beliefs may be entertained, and to feel sufficiently masters of themselves to discard contemptuously whatever may be found untrue."

Many of the leading statisticians of our time have been partly trained in the Galton Laboratory, which has given an impetus in the whole field of statistical biology. This is known by the term "biometrics," which Galton invented to express the application of metrics, the science of measurement, to biology, the science of life. In their biometrical investigation of tuberculosis, Doctors Stocks and Karn have compared the effects of sanitarium treatment of this disease with the results obtained by home treatment and the treatment given by public dispensaries. The investigation is of vast importance to modern philanthropy, to the medical profession, to our State and National Governments, and to thousands of individuals, even hundreds of thousands, who are at this moment debating the

serious problem in their own lives whether to go to a sanitarium for treatment of tuberculosis or to remain at home under the care of the family physician. For these reasons I shall not make any comments of my own upon a piece of scientific work fraught with so many important public sequences. I, therefore, give in their own words a description of the nature of the investigation and the results obtained by Doctors Stocks and Karn. In the introduction to their report they say:

ENGLISH STUDIES OF TUBERCULOSIS QUOTED

"Although it was one time believed that sanatoria were effective in curing phthisis, and at the present time it is tacitly assumed that they are at least effective in favorably influencing the progress of the disease, it has never been satisfactorily proved that such is really the case. The isolation of phthisical persons for a time and the training given them as to how they may be non-infective to other persons on returning to their homes must of course be of value to the community, and the long rest, good food, graduated exercise and fresh air must be of temporary value in improving the comfort and well-being of the patient in many cases. These facts are admitted by most, but unless sanatorium treatment is doing more than this and is actually exercising a beneficent influence on the progress of the disease which is demonstrably superior to that exercised by other forms of treatment such as can be carried out in dispensaries or at home, there are many who would hold the opinion that the advantages mentioned could probably be provided with less inconvenience to the patient and at a smaller expense to the nation.

"In contrast to these there have been four statistical researches on the question, all of which have been

carried out on good sanatorium data, namely, those of Elderton and Perry on the experience of the Adirondack sanatorium, of Bardswell and Thompson on data from Midhurst Sanatorium, of Hartley, Wingfield and Thompson on data from Frimley Sanatorium, and of Vallow on the experience of the Bradford Sanatorium. In the first of these it was shown that mortality after the discharge of incipient phthisis cases was about four times as great as that of the general population of the same ages, that the mortality of apparently cured cases was about twice that of the general population, and that in general the mortality experienced by sanatorium-treated patients showed no improvement over that experienced in pre-sanatorium days, judging from such figures as were available. Bardswell and Thompson found the mortality of incipient cases after treatment at Midhurst to be some six times, of advanced cases sixteen times, and far advanced cases thirty-eight times that expected in the general population of the same ages, and the corresponding figures obtained at Frimley were about four, sixteen, and forty. The Bradford figures were somewhat better for the incipient group.

"All these investigations have been based upon the same method; namely, to classify the patients according to age, sex, and condition on admission or discharge, ascertain the rate of survival of each subgroup after leaving the sanatorium and compare it with the survival rate of a life-table population at the same ages. No exception can be taken to these researches as far as they go, but they suffer from the defects that (1) they measure progress only by survival, and (2) they do not compare the tuberculous treated in sanatoria with the tuberculous treated at the same time and in the same districts by other methods, by which comparison alone we can hope to

reach any conclusion as to the real value of sanatoria in the fight against disease. The main objects of the present research have been to provide such a comparison, not only as regards mortality experienced but as regards progress toward recovery measured in other ways."

These investigators compared a large sample of tuberculosis patients who had received sanatorium treatment with another large sample of patients who had received care and advice either from a public dispensary or else had been treated at home by the family and the family physician. These patients were compared in numerous particulars which I give below in the words of the authors themselves:

"For ourselves we cannot think of any kind of selection likely to have any important influence on progress which would not come under one or more of the following heads:

"1. Sex.
"2. Age.
"3. Stage of the disease in lungs.
"4. Severity of constitutional symptoms.
"5. Nutrition of the patient.
"6. Financial resources of the patient.
"7. Amount of deterioration since coming under observation.
"8. Quality of dwelling.
"9. Amount of overcrowding in patient's home.
"10. Family ties."

After completing their prolonged and exacting investigation, the first of its kind ever made along these lines, the authors sum up their conclusions in the following paragraphs, which ought to convey a profound lesson to the mind of every statesman, both as to the

methods pursued and the results obtained bearing upon human welfare:

CONCLUSIONS ABOUT TUBERCULOSIS SANITARIUMS

"1. An exhaustive study of the histories of the first 2,794 consecutive cases of undoubted pulmonary tuberculosis brought under the survey of the Belfast Tuberculosis Dispensary from 1914 onwards leads to the following conclusions:

"2. A certain proportion of patients were recommended for treatment at sanatoria and those who stayed at least fourteen days, in addition to receiving the usual dispensary treatment before and after their visit to the sanatorium, have been defined as 'sanatorium-treated,' while the residue of patients who received only dispensary or domiciliary treatment have been spoken of as 'otherwise-treated.'

"3. The average ultimate progress as estimated of a period of six years unless the patients had been previously lost to view was undoubtedly worse in the case of the sanatorium-treated than in the case of the otherwise-treated for patients first seen in the incipient stage, but was not significantly different for patients first seen in the two advanced stages. There is some suggestion, however, that the very advanced stages requiring *hospital* treatment fared better in sanatorium than elsewhere, but naturally this is difficult to establish.

"4. These conclusions appear to hold good for both sexes and for young people and adults alike whether progress was estimated on a survival basis, by the ratio of actual to expected mortality, by the proportion improving to any degrees, or by the proportion in whom the disease became arrested or apparently cured; but by the last criterion the san-

atorium-treated showed a temporary superiority during the first two or three years which was lost in subsequent years.

"5. Every effort has been made to determine what kind of selection was exercised in the various circumstances which led to the formation of the group of the sanotoria-treated, particularly as regards any selection practised by the medical officers and how far this could account for their disappointing progress as compared with the residual cases. Selection on the grounds of sex, age, stage of or severity of symptoms was adequately corrected, for without affecting the conclusions appreciably, selection on the grounds of poverty, overcrowding or bad home conditions was shown to be negligible in its effect on progress.

"6. The initial nutrition had no appreciable relation to ultimate progress in adult males and only a slight relation in adult females. Adults selected for sanatorium averaged four pounds less in body weight than those not selected, which no doubt prejudiced their progress to a slight extent in the case of women, but not nearly to the extent to be accounted for. The extra weight acquired in sanatoria, averaging some three pounds in men and ten pounds in women, was very rapidly lost after discharge; improvement in weight over longer periods exhibited in men no relation and in women only a slight relation with the amount of sanatorium or dispensary treatment received.

"7. Having made every possible correction for factors likely to influence progress, the correlation method by alternative categories indicates that for each sex sanatorium treatment as contrasted with other forms of treatment was associated to a significant degree with inferior progress, which confirms the results of the other methods whilst dispensing with the

necessity of making assumptions whatever about the patients lost to view.

"8. In further confirmation, the correlation method proved the absence between length of stay at sanatorium and ultimate progress, but indicated an appreciable relation between regularity of dispensary treatment and progress.

"9. The only possible explanation which suggests itself is that the depressing psychological effects of a long period of enforced idleness in the company of patients similarly afflicted may in the bulk of cases counteract or even outweigh such benefit as may arise from other factors, and that the continued effort to 'carry on' at home may help in itself toward the mastery of the disease.

"10. No consistent evidence has been obtained from this research that bad housing conditions, as judged by rent, class of house, state of cleanliness of rooms, or overcrowding, had any influence on the patient's ultimate progress or rate of recovery.

"11. If the above conclusions are sound it will be well to consider (a) whether the great inconvenience to themselves and their families inflicted upon many cases of phthisis by sending them as a routine procedure for long periods to sanatoria is justified by the results; (b) whether this form of treatment should not be reserved for those in whom an unusual form of onset (e. g. hæmoptysis) has made a very early diagnosis possible, those who are so ill as to require hospital treatment, or those whose circumstances demand their removal from home."

My reason for setting forth in such detail the problems of prohibition and tuberculosis is partly, of course, the great biological and eugenical importance of the subjects. My chief motive has been, however, to emphasize the fact that we are living in an age of

science. We have the instruments, method and products of science lying all about us. Science, its methods and products, constitute the most insistent portion of the environment in which we live. This is a new fact in human history. Yet we have made very little appeal to the methods of science, indeed have in many respects defied these methods, in deciding upon such great public policies as the treatment of tuberculosis and the treatment of the problem of alcohol.

All men admit that both alcohol and tuberculosis are immense and pressing human problems. The considerations I have advanced neither prove nor disprove that the policies upon which we have embarked are wrong. But I believe they do prove that if these policies are right it is a mere matter of good fortune and not a product of intelligent social and political engineering. And my appeal is that, since we have the methods and instruments of science in our hands it is our solemn duty to make use of them in deciding upon all social measures. It matters not at all whether these social measures be the management of alcohol or tuberculosis or charity or social welfare generally, we miss the greatest possible ethical opportunity which this new thing, science, offers to men when we do not use its ministrations as our chief instrumentality for bringing to these problems an effective solution.

It may be these instrumentalities cannot aid us, but they are at least worth trying. If they fail, then I know of nothing else to try.

SECTION TWO

THE MODERN MAN, HIS WORLD AND HIS PROBLEM

II

THE THREE OUTLOOKS THAT LIE AHEAD

As I see the present situation, there are three great world possibilities which lie just ahead of civilized men.

The first possibility is, that men may destroy civilization on the battlefield and drown it in blood. In the face of the fact that there are in America alone over thirty peace organizations with large secretarial forces engaged day and night in pouring out a flood of documents, form letters, lectures, petitions, and that there are crusades, drives for funds and membership, and concerted offensives to force Congress to forbid all preparation for war; in face of the fact that over thirty-seven thousand manuscripts, many of them of the highest theoretical penetration, were recently submitted for the Edward A. Filene prize for "The Best Practical Proposals for Restoring Peace and Prosperity . . . Through International Coöperation;" in the face of the League of Nations, Locarno Pacts and numerous other immense efforts to insure permanent peace on the globe; in spite of the fact that efforts of this kind have been going on for a hundred years and the world was assured by many, supposedly penetrating, thinkers that another war was impossible—we find that war has not in the least diminished as a human undertaking;—perhaps we would be justified in saying, as a human sport. Beyond all question, as the new psycho-

biology has abundantly demonstrated, this is because war is fundamental in man's natural make-up, and as long as human nature remains as it is, carrying along with it all the biological baggage which it accumulated in the jungle, war will either continue or else can only be prevented by profound education of the individual and the utilization of the highest technical intelligence in the science of government.

MAN IS WAR

In an able book just off the press by Mr. John Carter, entitled *Man is War*, he gives an admirable summing up of those biological trends in human nature which make it evident that war is just as natural to man as peace; and that if we are ever to have a world of peace we must either change human nature or else we must give a power and influence to trained technical intelligence, in the conduct of government, which we have never accorded it before. Mr. Carter says:

GAS WARFARE MORE MERCIFUL THAN THE SWORD

"The war-scare-mongers are aided by the horror-boys, those whose profession it is to paint the terrors of the next war—despite protests by chemists and scientists that their data are absurd. They show off the super-gases, the super-planes, the bacteria bombs, and make our flesh creep with pictures of whole cities devastated in a few seconds. Yet comparative casualty and recovery lists show that the greater science in war the fewer the number of deaths. The shell spares more lives than the blade, the gas-attack spares more lives than the shell. Conversely, the supreme horror of modern war is not gas or bomb, but the bayonet charge.

"The effect of all this unabashed and unsound propaganda is not so much to convert America to a holy horror of war as to confuse the public and lead to muddled thinking in international matters. 'War is so dreadful that another war is unthinkable; another war would spell the downfall of civilization' is the argument. On the contrary, others wars are entirely thinkable, some are now in progress, and, far from being the downfall of civilization, are being waged ostensibly in its behalf. Who can doubt that, if the Turks started on the warpath in Iraq or the Japanese in the Pacific, the world would be informed that the future of civilization depends on exterminating the Turkish or Japanese peoples? Public opinion is confused and prevented from forming clear conceptions of right and wrong, of cause and effect, by such foolish dogmas. War is dreadful, certainly, but is dreadful only as death and suffering are dreadful; and hitherto no idealist has preferred his life to his ideal, no gentleman has preferred dishonor to death, no nation has preferred slavery to extinction; and until degeneracy becomes a virtue, no idealist, gentleman or nation will prefer the course of safety in such dilemmas.

RHYTHM AND WAR

"Appeals to pacifism, tempered with realism or distorted with emotion, are doubly mischievous because they give currency to an utterly unreal picture of human nature. Man is a compact of certain instincts which war has already capitalized as peace can never do. Chief of these is rhythm. A fascinating book might be written on the relation of rhythm to society: the beat of the seasons and the years, the rhythm of day and night, of sleeping and waking, the pull of the moon on the tides and on the sexes, the beat of the

heart, the rhythm of breathing, every organic process associated with man—to these the drum has an unanswerable appeal, and the drum is the symbol of Mars. Again, the instinct for preëminence, the desire for distinction, the urge of vanity, are very close to the heart of the race. The uniform sets a man off from his fellows (which is gratifying) and recommends him to the favor of women (which is even more gratifying). The uniform is part of the panoply of war. Opposite to the instinct of vanity is the instinct to follow the moving crowd, to keep step—the herd instinct. The sight of marching regiments is a powerful and subtle force which has been integrated to war. And, finally, there is the flag, the totem, the primitive rallying point for the organized crowd, the fetish which, from the time of the Roman eagles to the Stars and Stripes, is more powerful even than patriotism. In battle, hillock, a clump of trees, a village, or anything distinguishable becomes the gage of prowess and calls forth insensate efforts from the fighting forces. Civilization has harnessed to the use of war the primitive forces which are as old as man: rhythm, vanity, herd instinct and rallying instinct. Their symbols are the fife and drum, the uniform, the regiment and the flag. Against these the peace-mongers storm in vain, for they are so deep in human nature that they can never be eliminated.

"But beneath these lie the organic qualities of political society, which link it with the amœba. These are the instincts of self-preservation, self-perpetuation and self-aggrandizement. The perpetuation of any society is entrusted to its institutions—monarchy, constitutions, democracy, Fascism, or Bolshevism—which require bloodshed, violence and constant vigilance for their creation and preservation. Whenever such an organization of society is threatened from without, it reacts powerfully and characteristically in a spasm of

self-defense known as nationalism. Nationalism is therefore only a symptom of political adjustment, not a force in itself. It is the effort of a political society to defend itself or to obtain what is indispensable to its preservation. The third and most active principle of international life is the form of aggrandizement called imperialism. This represents the sum of the appetites and desires which prompt the individual to compete with the other members of his group. When the amœba is brought in contact with its food, it surrounds and absorbs that food; so do nations. The harsh law of nature suggests that what does not grow, decays. Imperialism is a vital impulse and one as necessary to the greatest nation in the world as to the newsboy on the corner—for in expanding, a nation is obeying the law of life.

"Accordingly, the efforts of the swarm of peace-enthusiasts spawned by the recent years of misery and turmoil are utterly beside the point. They can never outlaw war, for war is the first rule of life. When they base their appeals on false logic or mere emotion they are an actual danger to the world, for they prevent a sane and sober consideration of the true nature of man and the possibility of adjusting institutions to human nature. The most casual study of the enormous power and general appeal of the greatest single force for peace in the world—the Catholic Church—shows that its success is due to the fact that it has fitted itself to humanity and has never put too heavy a burden on the instincts of the race. Yet Catholicism has never pretended to eliminate all war, for it has never pretended that it considered war—or death—the greatest of evils.

"A few intelligent groups which are seriously trying to present the facts to the world are submerged by the fawning sentimentalists, the weepy emotionalists

and the professional alarmists, who make the means ridiculous and the effect nil. Until peace can present a stronger appeal to human and national instincts than war, it is little use for Geneva to send forth its ludicrous apostles: they merely befog the real issue, which is, not the biological necessity for war, but the biological character of war. The springs of conflict can not be eliminated through institutions, but through reform of the individual human being, and that is a task which has baffled the highest theologians for two thousand years.

"The heart of man begot the Roman legion and the Roman law, the Christian ethic and the Spanish Inquisition, the instrument of commercial credit and the practise of commercial war. Men have fathered the theory of liberty, equality, fraternity, the guillotine and the cheka. Man has created the frescoes of the Sistine Chapel and mustard gas. For everything begotten of man shares the nature of man and is as apt to destruction as to creation.

"The world will escape the blight of war when man has ceased to be human. The world will find peace when man is extinct. For man is war."

It is a curious thing that, notwithstanding the masses of "literature" sent out by our numerous peace societies, no examination has ever been made of the prime question as to whether war has actually diminished in frequency and duration among civilized races. Among his numerous researches in fields of eugenical interest, F. A. Woods has also examined this question in his book entitled, *Is War Diminishing?* The author concludes, after submitting the problem to extended statistical analysis, that war has not decreased measurably within the past three hundred years. This is an important fact which our peace societies have entirely overlooked and which strongly indicates that, despite

all our efforts and desires and our increasing horror at the very thought of war, it is unlikely that such an age-old-habit of man is going to come suddenly to an end.

As a matter of fact, people are often astonished that the increasing horror of war and the undoubted increase of humanitarianism during the past three hundred years have not automatically brought war to an end. They overlook the fact that the humane instincts are quite easily transformed overnight into war virtues under the influence of national wrath and excitement. During the World War, everyone will remember that the worst enemies suddenly became friends and stood shoulder to shoulder in what they believed was a noble crusade to make the world safe for something or other, no matter what. Neighborhood quarrels, some of which had lasted for a generation, were transmuted into a passion of mutual helpfulness.

This matter is so important and is so constantly overlooked by all societies working for peace that I feel constrained to give the essence of a letter from my friend, Woods, with whom I have recently been in correspondence upon this very subject. He says: "The willingness to respond to the appeal of battle is itself a virtue. Nature has made the ideally moral man peaceful in times of peace but warlike in times of war. The chief virtues of the average man spring from his desires to be helpful. Take as an instance the willingness of any chance stranger to stop and direct you when you have lost your way. If an accident has taken place, anyone and everyone is ready to lend a hand. In the same way in times of war, this instinct to be helpful to the group is of immense importance. No race could survive without it. A man instinctively renders help to his side of the fight and is very proud and happy if his services are especially noted.

"For these reasons we cannot expect that the in-

crease of sympathy, which has doubtless taken place since the days of the Crusades and the Inquisition, can lead to restraining nations from going to war. In time of peace, this sympathy and charity extends to all parts of the world. We readily give money to help the sick in Africa or China. But just before wars are declared, there is no longer any sympathy towards the hated nation. Sympathy and altruism are still at work, but their activities are confined within their own borders.

"Sympathy, a peace virtue, is also a war virtue."

Consequently, while we may desire peace and use all our efforts and intelligence to secure it, yet we must recognize that man is so little a rational being and so much an animal being that at any time the world possibility of war must be reckoned with by all intelligent men.

THE SECOND WORLD POSSIBILITY

The second world possibility which lies ahead is that men may go through a long period of social, economic and political muddling, without any very clear idea as to what they want or where they are going, or what they would do if they got what they think they want or got where they think they want to go, and with hell, as I have already pointed out, always waiting to break loose just around the next corner. This is too obviously the situation in which we find ourselves today to need further comment.

THE THIRD WORLD POSSIBILITY

The third world possibility is that men may apply human intelligence to human affairs. This is the only thing that has never been tried. If permanent world

stability and progress are to be anything more than an idle dream, either men must train more highly the intelligence they now have, discover more of it to train, and give it more power and influence than they have so far done, or else they must institute a eugenical social order which will of itself breed a larger proportion of intelligent and socially-minded, naturally civilized persons. Indeed, I think that the discovery of more and more intelligence and its better education is the prime condition for the breeding of more intelligence. In short, the highest education of the best people is, I think, the only way to breed better people; and the breeding of a larger and larger number of better and better people is the only way to make a permanently better world.

TAKING POLITICS OUT OF POLITICS

If men should conclude to undertake the last named of the three possible world programs—that is, if they should agree to put intelligence in the human saddle and give it the bit and rein; if they should conclude to call the trained intelligence from our schools and universities and put it in charge of all the agencies of social control; in short, if men should conclude to take politics out of politics and put them into the hands of trained technical social engineers (the policy I have already urged with reference to prohibition and charity and the policy which is now to a considerable extent guiding our measures of public health and the stamping out of tuberculosis and other infectious diseases), then there are four men who cannot aid the world in such an undertaking and just one who can. To find that one man, to train him, to infuse him with the new scientific social spirit and to elevate him to power and responsibility, is the one hope of the world.

THE OPTIMIST IS USELESS

The first man who cannot aid us in the hour of reconstruction and social fulfillment which I earnestly believe does lie ahead is the optimist. This does not mean that men should not look at life and face its tragedies and dilemmas with cheerfulness, hope and courage. Without these sources of spiritual renewal men cannot face life at all. Cheerfulness, hope and courage are the things which make the world go round. They change things, they change life, they change destiny. They transform hopeless tragedy into dignity, and they give the daily grind of life a robust and salutary significance.

But the professional economic and political optimist who infests our time is a man who believes that silk purses can be made out of sows' ears by deep breathing, "harmonic thinking" and voluble eruptions of the glad philosophy. He is not a man of real hope or real courage. His ostentatious cheerfulness is a defense mechanism to bolster up his own cowardice and his ignorance of any intelligent course of action. He thrusts his pestiferous formulas of sentimental nebulosity into the hard, practical affairs of men, as an actual solution of the problems they are wrestling with. He substitutes the pomposity of his own shallowness and asininity for true social courage and political insight. He believes that by repeating some phantasmagorical incantation to the effect that "every day in every way the world is getting better and better," this will in and of itself make it better and be an ample substitute for intelligent inquiry and authentic social procedure.

This type of temperament is rampant in this age as never before in human history; it is the underlying spirit of vast organizations backed by huge

sums of money, and it is one of the very chiefest obstacles to the progress of men to rational social control.

THE PESSIMIST IS USELESS

The second most useless man in the world is the pessimist. The pessimist is not necessarily the opposite of the optimist; he is rather a man who is trying to find optimism in despair and gain courage by a total abandonment of effort. This appears to him as a solution, and just to that extent it gives him the sense of having done something, having taken a stand, and that sense of psychological relief which all men seek when under the strain and pressure of difficulties. All men want solutions of their dilemmas. By the very nature of the mind, it is under stress in the presence of an unsolved problem. The optimist gets his relief from this stretch and pull of his emotions by the gay announcement to himself and the world that things could not be better. The pessimist gets his mental relief by an equally fantastic announcement that things could not be worse. Both get comfort by these mental escape-devices. The pessimist is a man who when he has to choose between two evils winds up by choosing both. As one writer has suggested, he would even commit suicide if he could do it without killing himself. He swallows, so to speak, both horns of the dilemma, and trusts "what gods may be" to save him from indigestion.

Both the optimist and the pessimist live in imaginary worlds, worlds of wish-fancies and defense mechanisms. They cannot help this world, because they do not live in it.

THE CONSERVATIVE IS USELESS

The third most useless man is the conservative. A conservative is a man who "believes that nothing

should ever be done for the first time." It is all very well if an earthquake breaks loose and does it once; it then becomes "precedent," a part of the status quo. The conservative puts his money into earthquakes, and they then become "vested interests," "the sacred rights of property." For example, men always have put their money into arms, munition plants and other forms of scientific hell in order to make money; they always have employed women and children without reference to their health or development. The word "always," to the conservative, makes just, right and wise this or anything else that has been "always." Congress has always debated until the country was both worn out and bewildered, and then has voted on the emasculated outcome. Therefore, to vote first and debate afterwards, which in many cases would bring just as wise results, would be "hasty, ill-considered action." If a dozen men of heart, conscience and high ability, trained to the last degree in the modern science of statistics, men such as Edward L. Thorndike, Raymond Pearl, S. J. Holmes, Carl E. Seashore, Edward M. East, F. A. Woods, Truman L. Kelley, Lewis M. Terman were elected to Congress and their methods put into effect—methods which involve no debate but only cold-blooded analytical inquiry into the facts—it would reduce the *Congressional Record* from a set of volumes which now have to be shipped in a freight car to one volume which could be carried in the voter's vest pocket. It would also, instead of bewildering his mind, chart out for him a clear course of political action. Your true conservative is a perfect illustration of the famous remark of the Yale professor who said, "The more I see of my classes the more I marvel at the infinite capacity of the human mind to resist the introduction of knowledge." Consequently, the conservative will never illuminate the world with a new freedom.

THE RADICAL IS USELESS

The fourth most useless man in the world is the radical. The radical is a man who believes that nothing should ever be done except for the first time. That first time is when his particular little pet panacea is put into effect—and that is all we shall need, because straightway the world will be ushered into an abrupt millennium. He overlooks the fact that while revolutions have always advertised this as the *dénouement* of their hand-made dramas, the results have never come up to the advertising.

The radical is always a thoroughgoing class man. He thinks he is a universal man equipped with an all-pervasive social philosophy. He advertises that when his class gets into power there will at once be something new; namely, progress. But whenever the radical has succeeded the instruments of progress, such as culture, education, liberty, poetry, beauty, have nearly all been destroyed. Men have had to make a new start. Throughout all history, whenever radicalism has succeeded, the people for whose comfort, liberty, protection, wealth and leisure the radical program was instituted, according to claim, have suddenly found that the limb has been sawed off between them and the tree.

As a matter of fact, progress is increase in wisdom, and revolutions never increase wisdom nor the number of wise men called into power. Wisdom comes from but one place—wise men's heads. Revolutions never increase the number of such heads, nor do they place any larger number of them in social control. Whether democracy shall succeed or fail depends upon whether it will be able to teach men how to find wise heads, and whether it can teach men, when such heads are found, to learn from them and trust them. The radical can

aid very little in discovering wisdom or in utilizing it in social and political processes.

THE OLD LIBERALISM AND THE NEW

Since none of these men can materially aid us in applying that sort of intelligence to our social order which will result not only in improving men's conditions but in improving men's inborn health and character—the final test of all human intelligence—who is the man who shall aid us to a sound social philosophy and execute political wisdom? I think it is evident that it is the new liberal. And the new liberal is simply the old liberal with his passions for human betterment gone to school to the new science and trained in the new social and political technique.

Certainly, the old liberal is entitled to our deepest respect. He has had a long and heroic history. When the Renaissance was in its heyday, it looked for a time as though the new liberal had really come upon the stage, and a thoroughgoing pagan in religion, a free spirit in ethics and art, an unfettered intelligence in philosophy, an experimenter in science and an aristo-democrat in politics, had come upon the world stage. But as this Renaissance of free intelligence in Italy swept northward and there gradually became transformed into the religious Reformation, it took on many new aspects, out of which, under the brilliant and rhapsodical inspiration of Rousseau in the latter half of the eighteenth century, the old liberal finally emerged.

Liberalism in any form was not the intention of the Reformation. Far from it, but the one hundred and fifty years of blood into which it plunged Europe finally came to this strange and unexpected outcome.

THE IDEAS OF ROUSSEAU

And according to my friend, Everett Dean Martin, the philosopher, of Cooper Union, New York, who has surveyed this period and has traced the development of its ideas with keen penetration, Rousseau and his philosophy developed five great ideas which even to-day are the Bible of the old liberalism. The five ideas of Rousseau are:

First:	The nobility, goodness and perfectibility of man
Second:	The goodness and kindliness of what Rousseau was the first to call "Mother Nature"
Third:	The inevitability of progress
Fourth:	The equality of men
Fifth:	The almightiness of the environment in determining the character, happiness and achievements of men.

In every one of these ideas, Rousseau and the old liberal were wrong. It is a curious thing that sometimes a principle wrong in the abstract will secure advantages for men in concrete ways. Under the inspiration of these wrong conceptions the old liberal has to a large extent freed men's mind from dogmatic theology, from political authority in religion, and from the "divine right" of kings. They next secured a number of the so-called "rights of man," such as free education for the masses, universal suffrage, the right to the free pursuit of happiness, and the right to make all the laws he pleased. This last-named privilege has been indulged in with such reckless gaiety that a child born in the United States in this year of Our Lord

1927, finds himself confronted by an array of over two million laws and ordinances for the good of his soul and the guidance of his conduct. All of these the stupidest man is supposed to have at his tongue's end and be ready to obey at a moment's notice. Some twenty thousand new laws and regulations passed by our state and national governments are every year added to this brief code of human conduct. Whether this has really added to the rights of man and the free pursuit of happiness, or whether it has only set up a more detailed tyranny, is a profound question.

As to the actual, concrete truth of the five great beliefs of the old liberal, the march of modern science has not left them a leg to stand on. They are all wrong. Yet when we hear radical and so called "progressive" parties announcing their platforms they are practically always talking in the obsolete language, scientifically speaking, of eighteenth century liberalism. Let us consider them for a moment:

First, men are not by nature just, wise and good. Some are good, some are bad, and some are indifferent; some are intelligent, some are mediocre and some are stupid. For this reason the masses, if merely given political freedom and a vote, will not, as the old liberal believed they would, necessarily rule themselves with sanity and intelligence. Without a new education, a new trust in leadership, a new reverence for superiority, a new application of the technical methods of science to their social and political affairs, they will not, because they cannot, rule themselves wisely and well.

Second, there is not a particle of evidence in all the discoveries of modern science that "Mother Nature" has the slightest interest in mothering anybody. Nature is neither good nor bad, neither friendly nor unfriendly. Rain falls on the just and the unjust without

the least favoritism. Death steals upon the innocent babe in its cradle with as little mercy as it does upon the murderer on his way to his crime. Science is unable to discover the slightest "goodness" in the universe or any concern for the welfare of men. Men attain goodness and welfare only to the degree to which they obey nature's laws.

It is for this reason, and for this reason alone, that men could not be moral—that is, intelligently righteous—until science taught them how, until science taught them the laws of nature and how, intelligently, to obey them. But the notion of the eighteenth century liberals, that Nature had up her sleeve a kind-hearted "purpose" to develop men in character and to provide them with a social and political state that would be a near-heaven, and perhaps even surpass such near-heaven in some of its appointments, has not received the remotest support from the laboratory revelations of the past hundred years.

INFLUENCE OF GERM-CELLS ON HISTORY

Third, progress is not in the least inevitable, unless it be in a much profounder biological and evolutionary sense than Rousseau and the old liberals ever dreamed of. There may be a true biological and evolutionary progress going on, but this is not what Rousseau and his followers meant. I shall argue, in the concluding section of this book, the question as to whether there is an inevitable organic progress going on in man's physical, moral and mental constitution. Indeed, it is in order to ask and to try to answer this question with real biological evidence that this essay is written.

But that there is a grand, all-embracing principle of social and political progress which will gradually bring our social order to "perfection"; that there is some

sort of a social or political pull ahead or a spiritual push behind man that is automatically carrying him on to an ideal republic, is not borne out by anything we know about human nature or human history. Indeed, the very progress or at least the apparent progress amid which Rousseau, Voltaire, Hume and their great liberal confrères lived has been shown by Woods in his *Influence of Monarchs* to have been due in the main not to some grandiloquent principle of progress, but to the germ-cells from which the kings of western Europe for four or five hundred years were born. Woods shows, by more exact and fruitful methods than have been used in any other historical work with which I am acquainted, that when the king was born from a good germ-cell, when he had sprung from a good family stock and consequently had inherited high abilities as a leader in war and government, progress in the majority of cases accompanied this purely biological phenomenon. And when the king chanced to be born from a germ-cell containing very few of those chemical packages which had the power to develop into high abilities for war and administration, then, in a majority of cases, hard times *immediately* fell upon the people, and progress, in the old liberal sense, came to a sudden conclusion.

Let us for a moment contrast the old liberal's mystical notion of progress with the simple fact found by Woods that with three hundred fifty-four rulers in fourteen different countries of Europe during the past five hundred to eight hundred years, the favorable conditions of the people—that is, those economic and cultural conditions commonly termed progress—were in seventy per cent. of the actual cases identical with the personal ability and character of the sovereign.

Let the reader who is honestly searching for the

true causes of social progress and for methods of investigation that bear any hope of revealing these causes contrast the mystical musings of such men as Rousseau in the eighteenth century and Oswald Spengler in the twentieth, and much of the merely descriptive theories of most of our cultural anthropologists as to how the elements of culture are created, utilized and carried on, with the modest statement of Woods, based upon sound mathematical inquiry into the causes of these phenomena. After surveying and tabulating the personal abilities of all of the kings in fourteen different countries of modern Europe and comparing them with the social and economic conditions, Woods says:

"A summarized statement of the results, in terms of percentages, would be: Strong, mediocre and weak monarchs are associated with strong, mediocre and weak periods, respectively, in about seventy per cent. of the cases. Strong monarchs are associated with weak periods, and weak monarchs (including non-royal regents) with strong periods in about ten per cent. of the cases. In about twenty per cent. of the cases mediocre monarchs are associated with strong or weak periods, or mediocre periods are associated with strong or with weak monarchs."

I shall return, in the concluding section, to a further discussion of this problem of the significance of leadership, not only as the chief element in social progress but also as the chief element in biological progress and as the prime agency in bringing about the next age of man. But I think the few but significant facts submitted above are sufficient proof that man cannot depend upon riding into the Golden Age of peace, plenty and pleasure, which is the usual conception of progress, upon some hypothetical principle of necessary evolution.

The fourth idea of Rousseau and the old liberals—

namely, the conception of the equality of man—is too grotesque to need extended discussion. The thing which modern laboratory methods of measuring the physique, the intelligence and the moral and emotional trends of men has revealed is not that men differ from one another, but the astonishing degree in which they differ. Dean Carl E. Seashore of the Graduate School of Iowa University has for years been measuring the differences in the native musical endowment of a large number of persons. He finds that of some elements of inborn musical ability some persons have two hundred times as much as others. Intelligence tests, now running into the millions, show that very much the same facts are true of man's whole intellect and personality. Consequently, any hypothesis of the equality of men or that they can be made equal, in talents, beauty, health, social graces, longevity or political capacity, by some environmental necromancy, has no support in modern science. Educational psychology is rapidly discovering that recognition of these enormous individual differences, and provision for the training of what a man has in him instead of some mystical notion as to what he ought to have in him, are the chief objective of education. As Dr. David A. Mitchell, the clinical psychologist, defines it, "the aim of education is not so much the development of special skill as it is to give a man a clear understanding of his abilities and a just appreciation of his limitations."

When we come to see that men cannot be happy or effective until their individual traits and abilities are provided for, we shall have made a real start towards building an industrial and political society for men. We shall then abandon the old liberal's conception of a benevolent social order—some Arcadian peace-plenty-and-pleasure-society—under the benignant supervision of some compassionate Mother Nature constructed for a hypothetical *man*.

Coming lastly to Rousseau's fifth conception, all men of the eighteenth and the first half of the nineteenth century believed that men were the products of environment, and most men believe it yet. They did not stop to inquire how this environment ever arose. It seems that it would have occurred to some of them that human nature had had something to do with creating human surroundings. If human nature has any power within itself to choose between alternatives—that is, choose between this act or that, choose to take advantage of this feature or that in surroundings and events and reject others—then the resulting environment must be due, to a considerable extent, to what these choices have made it. If this be at all true, then men are not the products of their environment, but to just that extent the environment is the product of men.

BLOOD SEEKS AND BUILDS ENVIRONMENT

It would require not one volume but many to argue to any decisive conclusion the complex problem of heredity and environment. It is at once probably the most complex and most important problem that has ever confronted human intelligence. As a contribution to the subject, Dr. Arthur Estabrook, of the Carnegie Institution, has for some years been studying in detail the families and communities made up from the stocks which first settled Old Virginia, as they have left this area and during the past three centuries have migrated westward. The net conclusions of his study, presented in a most interesting paper at a recent meeting of the American Eugenics Research Association, strongly supported the thesis that it is blood which makes and seeks environment much more than environment produces blood and character. By tracing particular families as they and their descendants

migrated on and on, over mountain and valley and plain, building community after community, he finds that the able and energetic individuals, as measured by their achievements, wealth and social influence, are the ones that are constantly found on the fringe of the frontier. He finds that certain families have furnished far the larger share of these energetic individuals. In every community a few of the older ones remained and stamped their character unmistakably on the social life and institutions in which they live. The younger members of these same families move on, and out of the wilderness constantly carve a career for themselves and create an environment which is the reflection of their own natural characteristics. He also finds that the weaker and more stupid families have thrived under the protection of the strong and able and have been a drag on every community into which their thriftless stocks have thrust themselves.

While such a study is, as Doctor Estabrook himself suggests, not as critical as we should desire, yet it is critical enough to throw the burden of proof to the contrary upon those who maintain that human cultures and environments are not the creation of men's own natures but that they create men's natures and make man what he is. If it is environment which causes the intelligence and character of men to be what they are, then there is no object in using this intelligence and character to make men better, and, indeed, there is no power in man to do this. There is no use in appealing to men to better their environment if they are themselves the products of that environment. You are plainly appealing to a power which does not exist; namely, an inborn capacity to build and choose environment.

As I have said, the argument could be carried on through this volume and many others; but these few

facts certainly suggest that any environmental interpretation of history, such as the economic interpretation of Karl Marx, the geographical and topographical interpretation of Buckle, the metaphysical interpretation of Hegel and the like, is fraught with grave difficulties. But it was this extreme environmental view of life and history which led the old liberal into the belief that the ills of man flow almost entirely from the ills of society, and he believed he could remedy all this by the simple legerdemain of giving every man a vote. He failed to see the complete logical contradiction between the notion that men could remedy all their discomforts and misfortunes by voting their own environment upon themselves and the notion that there was an inherent, evolving social principle which, if let alone, would carry men into the millennium. If this evolving principle, which in time is going to make us all healthy, wealthy and wise, can be depended on, then there is no need of our doing anything about it. But if it will not operate of itself, then it is useless to build our social hopes upon a piece of machinery which, however ingenious and intricate, has the annoying (but, to the inventors, entirely negligible) defect common to all perpetual motion machines, namely, that they won't work. The main body of modern biology and psychology does not, to any considerable extent, support the theory that a mere change in social machinery will directly in and of itself remedy the defects and the misfortunes of men. Such changes will help greatly to make men happier and more effective, because, as we have seen, the changes in social conditions brought about by different sovereigns throughout the history of modern Europe have done this very thing. But we should reflect that even here these changes have been brought about by a definite and clearly definable change in the inborn

natures of part of the people; that is, a change in the inborn capacities of the sovereigns.

A VOTE DOES NOT CONFER POLITICAL WISDOM

Certainly, these considerations at least strongly indicate that the notion that a vote would confer upon the masses of men some miraculous political wisdom they did not possess before and also inspire them with a mad passion for political education is not justified by what the critical investigations of modern science have been able to find out about the human mind and emotions; and, certainly, the notion seems hardly justified by either the practical history of the experiment of giving a vote to everybody or by the mental tests made within the past dozen years upon thousands of voters. With all our modern environment and education, many voters cannot even name the days of the week or count backwards from twenty to one or tell what is absurd in the following sentences:

"A man said: 'I know a road from my house to the city which is down hill all the way to the city and down hill all the way back home.' "

"Yesterday the police found the body of a girl cut into eighteen pieces. They believe that she killed herself."

Voters who cannot see any absurdities in these assertions are not likely to perceive any absurdities in prohibition or a free immigration policy or in the provision that the oldest member of the Foreign Relations Committee of the Senate should be its dominating head, without reference to his qualifications as an international statesman, or that our President should appoint to fill the position of Secretary of State and other important offices "lame ducks" who have become lame and been denied office by their own con-

stituents because, as Philip Guedalla, the historian, says, "their supporters have discovered their imbecility."

THE NEW LIBERAL AND HIS TECHNIQUE

Of course, this picture of the old liberal is too beautifully simplified to be entirely true. Yet I think it throws into fairly logical perspective the main tenets of his social, political and educational philosophy. He performed an immense human service, for without him we would likely still be back at Magna Charta and the Bill of Rights—at least back at the Declaration of Independence. His immense passion for human advancement has infused itself into education, industry and politics, and is the most hopeful thing to-day in the human outlook, provided he will only learn to apply to social processes the technical methods of science, instead of grandiloquent generalizations about a mythical and mystical economic and political man. It is the application of technical methods which makes the new liberal, and distinguishes him as a new sort of human being in the world.

The new liberal, instead of approaching the problems of human life and society with some ready-made assumption which he proposes to prove and which leads him to color all the facts and to find only the facts which support his assumption, selects some special problem and collects all the facts which pertain to it. He does not care what his facts are going to prove. He cares only to find out what they do prove. This is something new in the world. He approaches a social or a political or even an educational or a religious problem with precisely the same mental attitude, the same intellectual tools and methods, with which he repairs his automobile. When a man's automobile is

out of commission he does not refer in his mind to some grand general principle about broken automobiles, but he studies the practical ifs and ands of the situation, picks out the appropriate tools and without any waving of the flag or shouting of slogans or repeating ready-made formulas handed down by some philosopher of progress meets the difficulty in a sensible, concrete way. The new liberal does the same thing when he sets out to study man's social ills.

I have never known men to use optimism or pessimism or conservatism or radicalism or bigotry or dogmatism or fundamentalism or class or race prejudice to repair an automobile. I have never heard of men using such tools for any such purpose. And yet they seem to be almost the only tools in which we have any faith when it comes to repairing our practical social breakdowns and meeting our practical social difficulties.

Of course, dealing with an automobile is not so difficult as dealing with a distraught society. An automobile is not in constant eruption from its emotions; it is not subject to hysteria, although it often seems to be. A hundred automobiles do not form a crowd and act as crowds always do, from mass psychology. They do not do things in a mass that they would not do as individuals. Human beings do. An automobile is always rational to the limits of its machinery, but a human being seldom is.

For these reasons, while scientific truth is never a compromise, yet social and political truth nearly always is a compromise. Nevertheless, the new liberal tries to seize hold, by scientific methods, of the constant factors in human behavior, the ones that can be depended upon, and tries to utilize them in guiding social behavior and arriving at social conclusions. He has discovered that with all their complexities human

passions can be measured, human desires can be plotted out, curves that represent human emotions and aptitudes can be drawn on a blackboard or on a piece of paper, and the causes of human action can be reduced to number. And when things can be reduced to a number, when we can count human actions and say, "There are just so many of this sort and so many of that sort, no more and no less; there is this large a quantity of aptitude in this human being and that large a quantity in that one," it is then, as Sir Francis Galton said, that we have science. And the new liberal is simply the man who tries to apply to the affairs of men the science of number and the results of controlled experiment based on number.

THE NEW LIBERAL FACES A NEW WORLD

The new liberal would have been impossible in the old world in which men lived prior to science. He would have had no tools to work with and nothing but an emotional and mystical objective to work to. The old liberal is just as impossible in the new world which has been created by science. Indeed, the new liberal is the child of science. In his humanitarian spirit and his passion to make the world better he is a lineal descendant of the old liberal. But in his analytical spirit, his intellectual attitude and his cool-headedness he is a lineal descendant of the Alexandrian, the Greek and the Renaissance men. When Boccaccio, for example, a poor Florentine lawyer, heard that a teacher was coming to Italy to teach men Greek, and that he would be privileged to sit at his feet and learn this noble language and imbibe its free spirit and its gay and undaunted outlook upon life—the thing which in our day has become science—he shouted and danced for joy. And the new liberal is the lineal descendant of that

free and open spirit and that high passion for truth which the Alexandrian and the Greek brought into the world and which the Renaissance men joyously handed on.

But, of course, the new liberal faces a different set of problems, a different human environment from any which men ever confronted before. He faces a world created by his own spirit. And the tragedy, as well as the danger, of the modern world is that while the new liberal—the man of scientific spirit—created this world, while he invented its machines, while he discovered its physics, its chemistry, its biology and its psychology, while he created the very air men breathe to-day and the instruments they use to carry on their lives, yet he is not, himself, in social and political control of these vast agencies.

For what is it, let me ask the man in the street, that has happened to him and to all of us? As I see it, it is simply this: A few wonderful minds, called scientists, by living a new sort of life, a new kind of spiritual existence, by creating in themselves a new type of intellectual attitude, the attitude of utterly fearless experimentation with the universe, have created a world industrial machine. Out of this industrial machine has grown a world social and political machine, the like of which never before existed. And after these scientists, by living this new and strange kind of life, had invented this world machine, the business men and the politicians ran away with it. They thought they could manage it without themselves living that same kind of spiritual and intellectual life. They seized control of the instruments of science, but they did not understand its spirit. When men use railroads and steam engines and printing presses and gunpowder and poison gas and trolley cars and radio and telegraph and telephone, and do not understand

the spirit which created them and do not live the spiritual and moral life which made them possible, the world indeed is, as never before, in danger. For when men do not understand the spirit of science they use its instruments not to fulfill its passions, its lofty ethics and its happy and adventurous outlook, its unconcern for anything but truth and beauty and righteousness and moral and spiritual liberty—which is the outcome of truth—but to fulfill their own passions, their own lusts and selfishness—those old passions of the race, which have not been touched to new objectives nor disciplined to new issues by new grasp of the real world.

This then, it seems to me, is precisely the situation of the modern man. Science has thrown him into a new world. It has given him vast and intricate machines, placed in his hands huge engines of power which he can operate because most of them the scientist himself has made fool-proof; and yet he does not understand the real spirit which, with all the cold steel of the machine, is in reality within the machine itself. He does not know how to take to himself the kind of life which created the very machine he is using to increase his wealth, comfort and ease. He does not know how to apply that spirit and method to his own life's problems and to the solution of his social and political dilemmas. His own chiefest danger lies in this; that he does not even entrust the management of his social and political affairs to the men and the kind of intelligence which are the very agencies that have created the machines that have made him rich and arrogant and powerful. Science transports him over river and mountain and plain. It has encircled the loftiest summits of earth with his commerce; it has brought the products of the antipodes to his home and to his table. It has carried him through the very

heavens themselves. It has enabled him to converse with all the Seven Seas.

HAVE MEN REALLY LEARNED ANYTHING?

All of this is the creation of the scientist, and yet men will not trust him in the management of their social and political affairs. Nor will they take to themselves the kind of life that he lives, although the visible material products of that kind of life lie all about them and are in their very hands. With all these triumphs of science about them, they laugh at the idea that that same science could either manage their practical affairs better for them than they themselves can manage them, or that science can bring about a better spiritual life to live. For never in all history did men have so much to live for, never did they have so much to live in, never did they have so much to live with, and yet never did they seem to have so little to live by. We live in a world to-day where the very air is quivering with human speech, where the skies are actually vibrating with music and song, where every thought we think "goes shivering to the stars." Literally and actually, the time has come when "deep calleth unto deep," when "day unto day uttereth speech and night unto night showeth knowledge."

And yet, the real problem of the modern world is whether, with all this knowledge blazing before their eyes and quivering in the very air about them, men have really learned anything. With the winds of heaven laden with music and knowledge, never did men's lives seem so barren of true intellectual exaltation, nor their hearts so far from authentic spiritual anchorage. People who think they are educated—but who in reality have no idea what education is, because they have no idea what science is with its analytical

spirit, its intellectual liberty combined with spiritual discipline, nor what scientific truth really means—are flocking by the millions to bearded mystics, enshrouded occultists, bob-haired and rouged clairvoyants, dark-room mediums, Oriental voodooists, "applied psychologists," character analysts, pseudo-psychoanalyzers, hocus-pocus humbuggers, and are trying to get God out of ouija boards. These people talk bravely with the phraseology of science, but they haven't the slightest idea what science really means. They use its instruments and its vocabulary, but they don't know what it is all about.

If the reader imagines that I am talking vague philosophical fancies, let him contemplate a fact as brought out by a recent writer in *The Scientific Monthly:* One-fourth of all the citizens of Los Angeles, California, belong in these classes, and while most of them think they are highly educated they belong to societies strongly banded together, and backed by large sums of money, to fight the spread of scientific truth, which is the very thing that has made them rich. Los Angeles is probably no special rendezvous of humbuggery; yet this writer points out that with all the countless millions of wealth which science alone has created for the citizens of this section there is not a single laboratory in all Southern California for the study of experimental medicine, the field that requires a greater range of equipment than any other field of research and the one most directly and immediately beneficial to mankind. California, like all the other states, has made its fortune out of the instruments of science, but understands so little of the spirit and methods of science that this writer exclaims, "Look at the Governor of California refusing to endorse modern hygienic measures for fear of alienating the Christian Science vote, and the regents of the State University

denying adequate appropriations to the medical department for fear of antagonizing the Protestant religio-therapeutic bloc!"

This sort of thing can go on for a time. Men can live amid the luxuries created by science and at the same time war against its intellectual life and spirit on the one hand, and on the other hand refuse to apply either its findings or its methods to the management of their social and political affairs. Yes, it can go on for a time, but it will soon bring its own end.

In contrast with the attitude toward science of these antagonistic citizens of Southern California, whose wealth and power of propaganda themselves depend upon science, and in contrast with those fundamentalists who would tear the teaching of science from our school books, I shall ask the reader to contemplate the sheer nobility and dignity of the plea for the promotion of pure science which was made by Secretary Herbert Hoover at the December, 1926, meeting of the scientific men of America in Philadelphia. It is a plea which should be taken earnestly to heart by the humblest American citizen, because, as Mr. Hoover shows with exceptional force and clarity, the standards of living for our people depend almost wholly upon the advance of pure knowledge. And it is the scientist, working with ample funds and a free mind, who alone can advance the knowledge of nature upon which all our future welfare depends. Mr. Hoover said:

"These men of pure science are the most precious assets of our country, and their diversion to teaching and applied science reduces the productivity which they could and should give to the nation. It is no fault of their own, but it is the fault of the nation, that it does not give to them and to the institutions where they labor a sufficient support.

"There is no price that the world could not afford

to pay these men who have the originality of mind to carry scientific thought in steps or strides. They wish no price. They need but opportunity to live and to work. No one can estimate the value to the world of an investigator like Faraday or Pasteur or our own Doctor Millikan. The assets of our whole banking community to-day do not total the values which these men have added to the world's wealth."

So critical has become the situation, averred Mr. Hoover, that a survey of the men engaged in scientific research, and the sums existing for their support and the development of their work, showed that they had actually diminished in the last decade, whereas, in order to keep step with the developments of applied science, they should have immeasurably increased.

"Teaching is a noble occupation," Mr. Hoover continued, "but other men can teach, and few men have that quality of mind which can explore the unknown in nature. Not only are our universities compelled to curtail the resources they should contribute in men and equipment for this patient groping for the sources of fundamental truth, because of our educational pressure, but the sudden growth of industrial laboratories themselves and the larger salaries they offer have in themselves endangered pure science by drafting men from the universities. This is no complaint against our great industries and their fine vision of the application of science. It simply means that we must strengthen the first line of industrial advancement—pure science research."

He caused a ripple of laughter to run through his audience when he said "some scientific discoveries and inventions have in the past been the result of genius struggling in poverty, but poverty does not clarify thought, nor furnish laboratory equipment.

"Discovery nowadays must be builded upon a vast

background of scientific knowledge, of liberal equipment. It is stifled where there is lack of staff to do the routine, and where valuable time must be devoted to tending the baby or peeling potatoes, or teaching your and my boys. The greatest discoveries of to-day and of the future will be the product of organized research free from the calamity of such distractions.

"The day of the genius in the garret has passed, if it ever existed. The advance of science to-day is by the process of accretion. Like the growth of a plant, cell by cell, the adding of fact to fact, some day brings forth a blossom of discovery, of illuminating hypothesis or of great generalization. He who enunciates the hypothesis, makes a discovery or formulates the generalization, and thus brings forth the fine blossom of thought, is indeed a genius. But his product is the result of the toil of thousands of men before him. A host of men, great equipment, long, patient, scientific experiment to build up the structure of knowledge, not stone by stone, but grain by grain, is our only sure road of discovery and invention. We do have the genius in science; he is the most precious of all our citizens. We cannot invent him; we can, however, give him a chance to serve.

"No greater challenge has been given to the people of America since the Great War than that of our scientific men in the demand for greater facilities. It is an opportunity to again demonstrate in our Government, our business, and our private citizens the recognition of a responsibility to our people and nation greater than that involved in the production of goods or trading in the market."

WHAT IS LIKELY TO HAPPEN

As I have said, hostility to free science can go on for a time; it cannot go on indefinitely. Most of all,

men cannot go on if they refuse to apply to their own lives and the reproduction of their species the laws of their own biology which science has discovered. And, as I see it, unless we can bring the majority of men, at least, to a real understanding of the inner life and spirit of science and cause them to bring to the management of society an application of the same mental tools and attitudes which underlie science, I fear that one of two things is going to happen to this roaring, whirling, manufacturing, wealth-producing, rapid-moving world which science has created for the modern man to live in: First, either labor—proletarian labor, without culture, without tradition, without a sound social philosophy, without aristocracy, without polish and manners, without that reverence for superiority and intelligence which is the finest thing education can give to men—will seize and control this world industrial machine, and without thought or care for its finest and gentlest values will bend it to their own uses and train men in an industrial philosophy which has in it no social vision beyond their own materialistic interpretation of life and history. Second, if this does not happen, capital will, I fear, seize and control this world machine and, with an even greater lack of culture, with a total lack of those profound, pitying and compassionate human emotions which do animate proletarian labor, will not take the trouble to develop any social philosophy at all. It will, I fear, use science only as an instrument to exploit men on a bigger scale than ever, to chain them to bigger and bigger machines which they cannot control and which they do not understand. In the end, without any clear intent on its part or any clear understanding of what it is really doing, it will institute a well-fed, well-housed, well-clothed but nevertheless an uncultured, scientific barbarism without conscience or tolerance, and without a clear

recognition of those social and political responsibilities to weaker and less fortunate men which has always been expressed in "*ich dien*," "I serve," the motto which has animated every true biological aristocracy.

One of these two things, I think, is bound to happen to men unless they develop, by a combination of the old liberalism with its immense human passion and the new liberalism with its immense insights and its analytical methods, a sound social philosophy. Men have never had such a thing as a social philosophy. They have never needed one very much. But science and its mechanical inventions have made the world so big and complex, they have made the ethical obligations which one man owes to another so bewilderingly intricate; they have made human contacts so infinite and so diverse that unless a man has a clear, cool-headed and yet compassionate philosophy of his own social life and its responsibilities to his fellow men he cannot guide his conduct aright. And much more, if our industrial leaders, who are the real managers of the modern world, have no sound philosophy of their own duties and privileges, then all that science has done has been to bring us comfort without culture, excitement without meaning. All our scientific knowledge, our discoveries of man's biology and psychology, have not enabled us to build a society that has made him or can make him any better in his inborn nature, his natural health, intelligence and passions—any better than he was the day that he left the jungle and stood, dazzled by the glittering splendors which he saw in his imagination ahead of him, upon the threshold of civilization.

THE REAL QUESTION OF THE MODERN WORLD

What, then, is the real situation of the modern man,

and what is the superlative question which confronts him?

Let us look back for a moment over the previous pages and review the main steps by which we have come, in order to see whether they do not enable us, at least, to ask this question with intelligence, whether or not human intelligence is to-day in a position to give a fruitful and dynamic answer.

We have seen that man is naturally a jungle animal who has been injected into the midst of polite society. Probably nearly all of this society, its polished manners, its ethics and culture, and what we would call to-day its traffic regulations, was developed by a very few men. The forces of nature had acted ceaselessly upon man's mind and body for untold ages, in order to produce a creature adapted to jungle life. A few of his geniuses, however, invented civilization which placed the masses of men in a new environment. It is absurd to suppose either that civilization was not the outcome of fundamental trends and passions which had been evolved in pre-civilized days, or that the impositions of this new environment upon him should stop his evolution. Nothing can stop evolution. As Mark Twain said, "there is more or less weather going on all the time." There is likewise more or less evolution going on all the time. It is highly probable that so radical a change of environment for man set his evolution going at a faster pace than ever. However, there is one thing which he did not reckon with, at least, adequately, and that is that the ease and comfort of civilized life and the prizes which it set up for the most successful and the ablest men to strive for would lead them to decrease their birth rate. Consequently, as time went on the experiment failed time and again—partly, at least, because the leaders vanished and the masses of men had not evolved to

the point where they naturally lived a civilized life and carried on a complex social order, not because the leaders made it for them but because it was just their natural way of living.

In the modern world, however, a new force has arisen that is laden with a might, a magnitude and a meaning for man's future evolution which the wisest of men cannot now foresee. Indeed, only a few score of men out of the nearly two billions of persons now on earth have ever even thought of what it might mean to man as an organic being. This new force is the control of nature by human intelligence, known as science.

We have seen that this agency, science, has thrown man again into a new environment which is almost as different from that even of the past few centuries of his development as those centuries were different from his prehistoric days. Within the past quarter of a century much striking evidence from the fields of biology, anthropology, psychology—and the summation of them all, sociology—has been developed that man is undergoing a new evolution. This has led a handful of men to inquire what this evolution is, whither it is trending and what sort of a creature it will evolve. In short, they are asking a question about which civilized men have never before thought; if they had thought about it, they would have had no means of answering it as we have now. That question is, What is civilization doing to mankind? Is it making him naturally better or naturally worse, naturally stronger or naturally weaker, naturally more intelligent or naturally more stupid? To put it in a more concrete form, the question of the modern world is just this: *Will science enable men to build a civilization which, by its social customs, its educational methods, its religious and ethical idealism and taboos, its*

economic adjustments and its political procedures—its essential structure, its inherent drive and dynamics—a civilization which will force the human race biologically upward; or will science be only a new and more terrible instrument than men have ever known, by which they will be forced biologically downward?

This is the real question which confronts the long-range statesmanship of the age. It is the hope of the following pages to contribute something to the answer.

SECTION THREE

THE FOUR CORNER STONES OF RACE PROGRESS

III

WHY CIVILIZATIONS HAVE FAILED

I TRUST that the preceding pages have made it clear that civilization does not bring evolution to an end. Man has often recklessly thrown all his biological capital upon the gaming table of civilization, and risked all the gains of his evolutionary history upon a single throw. He has done this because he has supposed he was gambling on a "sure thing"; he had not the slightest idea that he might lose. He supposed that his biological capital was intact and that there was no danger of dissipating it. In other words, he has never until the present rise of the biological sciences had the slightest idea that civilization did anything to him as an organic being.

Science, however, has discovered that civilization tinkers with the human germ-plasm upon a more gigantic scale than did the jungle. If it does nothing else, it increases his food supply, and this at once enormously increases his numbers and the range of his migrations over the face of the earth. And, as Prof. Ellsworth Huntington has shown, these great changes of climate and weather which man's migrations lead him into, these changes of habitat, have worked profound changes in his physique and his mentality, as well as changes in the sort of civilizations that he builds. The particular type of civilization that a race erects, in turn works still further changes in its organic composition. Some of these changes have probably improved man in his natural

capacities. But when his social orders have reached the climax of their success and to all outward appearances all has been going well, slowly but silently the forces of nature have been at work upon the human constitution. They seem, as a rule, to have brought about not improvement but biological decay. This has especially brought about decay in the intelligence and moral character of the leaders. And, finally, the very material success of the enterprise has been the biological agency which has brought it to its tragic and disgraceful end.

No one is reckless enough, of course, to believe that this biological factor has been the sole cause of the rise and fall of those buried civilizations whose ruins and whose lost arts are now exhibited in motion pictures for the excitement and entertainment of the masses. Many of those who now gaze in vacant wonder upon these pictures of bygone human grandeur can scarcely read even their own language which feebly describes these marvelous creations of the men of long ago. It certainly does not rouse in them anything more than idle curiosity as to why such wonderful and apparently successful social enterprises should have ever passed away. But in the scientist and social philosopher they at once stir the imagination and baffle the intellect as to why they did not go on to still greater triumphs, and why his own present culture is not simply their direct consummation. It seems unthinkable that men should ever have experienced civilization, with its comforts, its adventures and its pageantries and ever have given it up voluntarily. In every case there has been at least a heroic remnant that died fighting to retain its values. But the remnant has not been large enough to save the social heritage, with all its pomp and circumstance—the long results of toil and time—from utter devastation.

And as the social philosopher sits by the side of the moron and watches the passing of these lost paradises, he wonders if this is the inevitable fate of all civilizations. He wonders if there is inherent in the very enterprise itself those agencies that bring decay, and if his own civilization is going to go the same way. And he wonders too whether those instruments of science which have charted the heavens, have solved the secret of the "balancing of the clouds" which so puzzled the mind of the poet Job and have weighed the atom and the stars, cannot also penetrate into this mystery of his own being and progress, and devise a way of living happily and effectively in the midst of wealth, refinement and culture, until the end of the earthly drama. It is this passion and the hope of solving this, the last great mystery that confronts human intelligence, that have given rise to the science of eugenics—the science of building a social order which will both give to men the richest, most varied and spacious life and environment of which their intelligence is capable, and at the same time produce a race inherently well-born.

EUGENICS MEANS A HIGHER CULTURE

There are many who have gained from superficial knowledge the idea that eugenics is a harsh, hard-hearted, purely biological program for destroying the weak and arbitrarily giving all the prizes of life to the strong. If this were true it would destroy the finest values of culture and the richest flowerings of the human spirit. There is a popular idea that eugenics means to do away with our hospitals, our welfare agencies, our Red Cross, our Salvation Army, our efforts to cure the social disease of the slums, our efforts to abolish poverty, our religious injunctions to visit the poor, the sick and the fatherless. The public

has been warned by irresponsible critics of eugenics that for these measures we propose to substitute a cold-blooded Spartan program of neglect of the unfortunate and even their wholesale destruction. Eugenics is pictured, in a number of recent magazine articles and books, by those who have spent a few hours instead of many years in the contemplation of human biology and its relationship to human culture, as a Nietzschean worship of a super-race, a race of strong men who "live dangerously," dangerously especially to those weaker and less fortunate than themselves.

EUGENICS NOT A WORSHIP OF THE SUPER-MAN

If eugenics means this or any approach to it, then I personally have no interest in it. If eugenics means the sacrifice of culture, then I am for culture. The present world and the present human race, with its weakness, stupidity, folly, disease and crime, and its probability of social failure, is good enough for me. If eugenics means the sacrifice of the things of the spirit, then I am for the things of the spirit. They are more precious than a Nietzschean super-race could ever be. If eugenics means only another human jungle, gilded with the glittering tinsel of the material creations of the intellect, laden with the conveniences and encumbrances of wealth and whirling in a maze of ingenious and interesting mechanical contrivances, then I do not care what sort of race lives in that sort of jungle.

HUMAN SYMPATHY NECESSARY TO EUGENICS

Not only is eugenics nothing of this kind, but it could not be anything remotely approaching so fantastic and asinine a conception of the manner in which human cultures affect human biology. Human sym-

pathy began in the animals, when some member of the species first felt the urge to take care of its offspring and give these offspring, if necessary, its own life, to preserve them. Those animals which possessed this coöperative urge in the highest degree gathered into herds where the motto was "All for one and one for all." This trend reached its highest development in man and has been a prime factor in enabling him to become civilized and build his complex and multitudinous cultures.

Obviously, if man should set up a society which had as one of its great objectives the weeding out of this sentiment from the race, this foolish objective would defeat its own end. The sentiment would soon become so thin and weak that the race would not hold together. As a consequence, eugenics is not, as it is commonly regarded by the uninformed, a purely biological program. Its advocates are not dedicated solely to hereditarianism. They are as deeply concerned over man's environment as are the environmentalists themselves. Indeed, the biologist and the student of heredity know as no one else knows that it is the environment which determines the trend of heredity itself. It was when this majestic conception dawned upon the imperial brain of Charles Darwin that the world had for the first time a plausible suggestion as to what were *some* of the causes, at least, that had worked the marvelous changes in the hereditary constitutions of plants and animals. The biologist knows, as no one else can know, that it is only by the manipulation of the environment that he can control the processes of heredity. And what is true of plants and animals in this respect is true of men. Eugenics means no slackening of man's efforts to improve his environment and expand his social and artistic enjoyments, nor does it mean any lessening of

his humane activities. If it does, eugenics spells race decay, not race improvement.

If civilization is bound from its very nature to fail, nevertheless it is a noble tribute to human intelligence and character that time and again it has been begun. If civilization carries within itself the seeds of its own destruction, still it is better to have had it for a time and for a few than to have missed from the great human drama its grandeur and pageantry. As the poet said of human love, it is better to have become civilized and lost than never to have been civilized at all.

But eugenics is an effort to preserve man's culture as much as it is an effort to preserve man's heredity, because only by preserving the one can its advocates preserve or hope to improve the other.

EUGENICS THE FLOWERING OF CULTURE

For these reasons, eugenics is the very flowering of culture. Race culture and spiritual culture are synonymous. Eugenics calls to all that is finest and best in the human spirit. For if men cannot be induced to take care of the cripple before their eyes, it is idle for some enthusiastic advocate of eugenics to try to rouse in them that still greater and longer-range humanitarianism which will induce them to make one of the great objectives of their civilization the prevention of the possibility of cripples being born a hundred years from now. Personally, I see no other way by which we can set up in our society, especially in our young men and women, those lofty ideals of physical excellence, intelligence and moral character which shall influence them in their mate selections and in their production of children. And biologists know of no other way than an improvement in mate selection

and in birth selection by which we can improve the future organic health of the race.

Plainly, then, eugenics is simply the new social, educational, religious, industrial and political statesmanship. It is the problem of correlating social evolution, social life and customs with biological evolution. And if social evolution stops, eugenics will automatically stop with it. Man will be hurled back once more into barbarism, where nature will take him in charge and once again, as she has done so often, administer her eugenical discipline with an iron hand. There are, therefore, before man three great eugenical problems: First, the preservation of his cultures, which are the only means for carrying out any eugenical scheme; second, the preservation of his numbers, which is his only means of carrying on either a social or a biological experiment which shall be as large as the planet on which he lives, because nothing short of a planetary eugenics is really creditable to his intelligence; and, third, the conservation and increase of the biological capital bequeathed him by his long jungle evolution. Eugenics is, therefore, a cultural program as much as it is purely a biological hereditarian program.

In short, the problem before the eugenist is to improve man organically in the midst of a great culture, in the midst of a great humanitarianism, and in the fullest exercise of his religious, esthetic and social emotions. If we look at it from the ethical side, this means, I think, that the eugenist can safely espouse—indeed, I think he must espouse—a higher biological Epicureanism. For when the higher Epicurists said, "Eat, drink and be merry, for to-morrow we die," they meant it not, as is often supposed, as a license to indulge in licentious dissipation, but as a stern yet happy command to live a lofty, ethical life of modera-

tion, tolerance and joy. And I think that we who advocate eugenics as the next and supremest challenge to human intelligence and character, and the next step in human evolution, must adopt the biological Epicurean motto, "Let us be merry with our culture and all its values, because the values can be so directed that persons of intelligence, health and virtue will be given a better chance to live long in the land of their fathers and hand on their health and their generous natures to an ever-expanding race of descendants; let us indulge in a perfect orgy of humanitarianism and save the weakling, the poor and the fatherless, the tubercular, insane, feeble-minded and unadapted. Let us, however, in the interest of future human health and happiness, see to it that these to whom our sympathies have extended the privilege of a happy earthly life, instead of sounding for them the death knell of the jungle, shall not have the high biological privilege, which should always run parallel with social privilege and always be under social control, namely, the privilege of reproduction."

If men can establish a civilization shot through and through with this ideal, it will mean that their intelligence has at last provided a way of living the happiest and finest and richest life of which their bodies and souls are capable. But it will at the same time provide—indeed, necessitate—that the intelligence and emotions which created it all shall survive in ever-increasing power and beauty. We see, therefore, that it is the loftiest impulses of man which lead him straight to the eugenic ideal; it is the highest triumph of his intelligence that he has, through science, wrung from nature enough of her own secrets of evolution to put that ideal into effect. And if man at this stage has attained the fortitude, the patience and the spiritual drive to apply these secrets to his

own being, it will be those very sections of the race endowed with this noble temperament and racial passion which will by this very process be preserved for the evolutionary task that lies ahead; namely, the ushering in of the next biological age of man.

EUGENICS A PART OF DAILY LIFE

If the considerations advanced up to this point have validity, it seems plain that man must apply the lessons of his jungle life to his civilized life; in other words, he must institute a program of eugenics as wide as the new sort of life into which civilization has plunged him. And eugenics cannot be something separate from his general worldly life. *It must be an animating part of it.* Eugenics cannot be a separate propaganda, some scheme entirely separate from man's every-day activities—such, for example, as the Sunday school or the church or the college is in our day; it must be a living part of the social, commercial, educational and political life of the common people. Eugenics must become the very essence of the environment in which men live.

If these suggestions be sound, then eugenics has plainly before it two great objectives: First, the preservation of the race from deterioration in the midst of a capacious, stimulating and happy environment; and, second, the improvement of the race by means of this environment. Man can never call himself really civilized, or delude himself into boasting that he has constructed an intelligent world for himself and his descendants to live in, until this situation obtains as the permanent earthly life of human beings.

Furthermore, if these considerations have genuine validity, then I believe that the biological sciences—which term includes all we know about living things—have given us four great discoveries which are bound

to be the corner stones upon which a truly eugenical civilization must rest. These discoveries must become the new organizing principles of education, religious ministry, politics, industry, and the ethics which pervades all of these phases of human behavior. No previous race of people ever possessed these discoveries. They are wholly new things in human knowledge. The men who built the civilizations of the past could not act upon them, because they did not know them. They went at the task entirely blind. But science has opened men's eyes. As far as the laws of his own being are concerned, science has, literally, given man a new heaven and a new earth. If from now on men do not act upon these principles they are precisely those of whom the Master said, "They have eyes but they see not, ears but they hear not." The man of the past, even in the midst of his social failure, could at least say, "I did the best I knew; I would have done better, but I did not know how." We cannot say to them, "You ought to have done better." This is the attitude we take toward children when we have given them a watch to play with and they ignorantly wreck its delicate mechanism. Man has always tinkered in the same childish way with the most delicate mechanism in all the universe, the mechanism of the living cell from which he himself is born, the cell from which he derives the traits of his own nature, and by which he hands these traits on to his children.

But we know now as men never knew before, the nature of this delicate mechanism. We do not know how it is wound up. We do not know who was the Winder. We believe—each man according to his own philosophy—that the Winder was simply "that high, unknown purpose of the world which we call God."

But we do know how this mechanism operates, how

it hands on the natures of men from one generation to the next. And if we wreck this marvelous piece of machinery the men of the future can and will say to us, "You ought to have done better, because you did know how." This may be a very simple way of stating the duty of the modern man amidst the vast complex of social forces, but it has the merit of being perfectly clear and inescapable.

Let us examine, very briefly, then, these four great new principles, which have always, without his knowing it, governed man's earthly life, and which always will govern it. It merely rests with him now whether he will make a better use of them, since he knows them, than he did when he knew them not.

THE FIRST CORNER STONE

The first corner stone upon which an all-inclusive eugenical program must rest is the fact that *the mental, temperamental and spiritual traits of man are inherited by the same mechanism and in just about the same degree as are his physical traits.*

It is commonly believed by both laymen and the majority of scientific men that the mental and spiritual traits can be changed much more by education than can the physical traits. While there is a great deal of evidence that this belief is justified, nevertheless, in my judgment, it is far from having been absolutely demonstrated. It is highly probable; the evidence is very strong; but with all that, we do not know it absolutely. These pages assume that it is true, but I wish to go on record with the foregoing reservation.

WIDE DISBELIEF IN HEREDITY

I think it scarcely necessary to submit evidence, at this period of the world's history, that the bodily traits of human beings are inherited. It seems un-

necessary to prove that children are more like their own parents in physical appearance and make-up, as a rule, than they are like other parents. Still, I find that a good many extreme environmentalists do not believe in heredity even to this extent. They are such confirmed believers in the notion that man can be altered in his inmost being by some form of training and education or by some social and political hocus-pocus that they will not concede that a man is any more likely to look like his own parents than he is to look like the first person he chances to meet on the street. If, as we often hear, there is "nothing to heredity," this is precisely what would be the case.

As evidence that this notion is still rather widely held, let me cite the experience of my friend, Mr. Alleyne Ireland, the publicist, who recently questioned, on this point, one of the foremost leaders of political education in America. This gentleman has for many years profoundly influenced the political ideas and beliefs of many thousands of Americans; yet, according to Mr. Ireland, he said that he did not believe in heredity or have any patience with the idea. Mr. Ireland then asked him if he believed that his children were just as likely to look like the first person they met when they turned the next corner as they were to look like their own mother and father. He replied, he thought that they were. Mr. Ireland next asked him if he believed that the children of a white man and white woman were just as likely to be Negroes as they were to be white persons. He replied again that he thought this was the case, and added that if such parents had white children instead of black it was entirely due "to the grace of God!"

I am not at all surprised that a politician should have such profound faith in the grace of God when it comes to determining the effects upon the people of

some of his political policies. He seems, at least very often, to take very few precautions on his own part to see that his measures shall turn out for the welfare of the people. He does not seem to trust quite so much, however, to divine intervention to insure that they shall enhance his own welfare. He provides for that himself. But when a leader of political education has so little faith in the uniformity of nature, it appears to me to be a pretty dangerous portent in our political life.

Those people who believe there are no established habits in the universe and who believe that the course of nature is likely at any moment to be upset by some capricious celestial meddling should apply to such beliefs the famous remark which Henry Ward Beecher made on one occasion to a body of young divines who were receiving their diplomas from the theological seminary. Mr. Beecher said that many of them, he had learned, had been agonizing in spirit as to just where they would locate their pastoral efforts. "I do not think," said the great preacher, "that you need to feel any great anxiety on this point, because I do not believe that the world will give way very much at the place where any one of you happens to locate." He continued, "I do not say this, gentlemen, because I wish to make light of your immense intellectual weight, but because I have such an abiding faith in the stability of the planetary system."

BEHAVIORISM QUESTIONED

The political educator and, indeed, all extreme environmentalists, must believe that we are living in a universe that has very little stability or uniformity. It is most assuredly one which cannot be depended upon. Our Behavioristic friends are just now giving

us assertions that are not only far beyond any demonstrated facts in their possession, but, I believe, are contrary to any possible belief in a continuously dependable mental life. They assert that all behavior, or practically all of it, is due to environment. I have no belief that a paragraph or two will either describe justly or refute the position of Behaviorism. Its experimental work, I have no wish to refute. It stands for itself, and is a most worthy addition both to our knowledge and to our conception of the nature of the mental life. But it seems to me doubtful that a host of random and unrelated environmental factors could possibly produce in an organism which has in its own constitution neither organic continuity nor differential sensitivity, a consistent and logical mental life, or, if the Behaviorist prefers the term, physical life.

If all organisms are born alike, and have no inherent organic differences, it is certainly a strain upon our conceptions of the theory of probability to believe that a vast number of environmental stimuli, which are not themselves causally related, would build up modes of reaction which are causally related. I have no personal objections to a purely mechanistic description of the life process itself. I have been so far unable to see, however, how stimuli which are inconsistent and unrelated can build up consistent and controlled behavior. If the organism does possess any individualized powers of reaction against its environment—that is, a capacity for consistent and purposive behavior—I am unable to see how these arose within the organism itself by purely mechanical processes; and if they are possessions of the organism, I cannot conceive of them as not being also possessions of the species to which the organism belongs. If they are possessions and characteristics of the species, they are surely transmitted by heredity down the racial stream.

Nor is this view necessarily an assumption that the vitalistic conception of the nature of organic life is the true and valid one. The vitalist assumes that in all plants and animals there is an inner "life force" which directs growth, development, reproduction and evolution. He also usually assumes that this life force is working toward a definite purpose or ideal. Personally, it seems to me that this conception, commonly known as "vitalism," usually leads its adherents to mysticism. They usually arrive at a mystical explanation of these natural processes, which appear to me to be purely mechanical. I think it is a triumph of the biological sciences to have demonstrated that birth, growth and death, the fertilization of the egg, and all the processes of development which this fertilization sets going, are entirely mechanical.

However, when it comes to the behavior of the organism as a whole this presents an entirely different problem. This is a mystery which I think the instruments of science, of necessity mechanical, have so far completely failed to explain. Of course, one can assume a defiant mechanistic explanation of thought and behavior if one chooses, but, in my belief, it is not the safest assumption at the present time. At least, it is difficult to see how, when we consider the nature of the laws of chance, random environmental factors could produce anything but aimless random behavior instead of logical, purposive action. The Behaviorist replies to all of this that there is no such thing as purposive behavior, and that thinking has no purpose in it. Without arguing the matter here, I have been, so far, unable to see how a mere chance combination of random forces, which have no relationship to each other and no special reason for being collected in a particular combination or in a particular individual, can ever produce upon us the effect of making us think

we are thinking; nor do I see how it can develop conduct which gives us the feeling that it is under the guidance of an ideal which lies ahead. It is difficult to see how the food and chemicals taken into the body and the general stimuli of heat, light, moisture and the like can cause an organism to act in a purposive way under the influence of *events which have not yet occurred.* I think it highly probable that physics and chemistry can explain the actual bodily movements and the brain changes which take place while I am writing this passage on my typewriter. But I do not believe they explain *why* I am doing it. I am doing it, in fact, under the influence of idealistic stimuli; that is, under the influence of events which have not occurred but which I expect will occur. How the future can possibly be retroactive and produce chemical and mechanical effects in my body and cause me to move in certain logical ways which must be purposive, simply because they produce systematic, logical and expected results, I am unable at present to see.

While I believe biology has triumphantly demonstrated the mechanistic nature of the life processes themselves, it has hopelessly failed so far to explain to me thought and behavior. Chemistry and physics can explain an organism which merely works, but I think they have not explained an organism which lives a personal life of meanings and values. I see no explanation of this except some sort of dualistic conception of the universe in which we live; that is, a universe in which there is something which is not aimless, mechanical force. We can call this other substance "mind" or "spirit" or any other convenient term. There are numerous technical, philosophical conceptions as to how this dualism of spirit and matter operates. It is unnecessary to go into them here. I

merely wish to point out that one need not be either dogmatic or sentimental or behind the times in science to believe that science has not explained the whole universe, although the Behaviorist assures us that he has done so and that there is no longer even any need for philosophic reflection, or any possibility that life and thought have any meaning or purpose which are significant to the individual himself.

ENVIRONMENTAL VIEW EXTREMELY PESSIMISTIC

The man in the street and the social reformer like to believe in the power of the environment to change men, chiefly because they think such a belief is the only optimistic one. I have already mentioned this point and expect to argue it at length in a future volume. We all like to believe in the power of environment. We like to believe that we can influence people about us, that we can change them, that we can alter their behavior, their outlook on life, their fundamental characteristics. A parent likes to believe he can train his children in the way they should go, and that they will go that way. He feels an immense responsibility for their moral character, and he believes that their abilities in gripping life effectively depend largely upon the environment with which he surrounds them. He is by no means altogether wrong in holding these beliefs and acting upon them.

What children do and what they become depend to a considerable extent on environment and opportunity. But parents should reflect that just in proportion as environment can mold children, their fate is a matter of mere luck and chance. If they chance to have good surroundings they will be good people. This sounds very lovely and optimistic. But it carries with it the terrifying thought that exactly the opposite

would also be true should they chance to have bad surroundings. If good environment will make people good, then bad environment will make people bad. And if this theory be true, then it will affect all people equally. Those people who have by good luck had a good environment will be good people, and those who by bad luck are thrown into a bad environment will be bad people. In other words, there is no possible escape from this awful and fateful power of environment. A man is what his environment makes him.

The reason for the scientist's clinging to the notion of the power of environment is merely that he wants to find the truth of the matter; but the reason for the average man's clinging to this notion is that he believes it is hopeful and kindly and that it softens our views of human life. If he will reflect, however—and I wish some of our leading educators would reflect—upon the other side of the problem, if he would just go around behind the picture and take a look at it from the back instead of from the front, he would see that he is unwittingly espousing and preaching a doctrine of unvarnished, cold-blooded, unmitigated pessimism and fatalism. A number of distinguished scientists have done me the honor to say that I am the first student who has pointed out this logical contradiction in the reasoning of both the common man and the scientist.

ENVIRONMENT FATALISTIC FROM THE CHILD'S STANDPOINT

Even a number of biologists in their published writings have been rather apologetic in presenting the facts which indicate to them that heredity is a powerful factor, and probably the most powerful factor in determining human character and destiny and in awarding the prizes of life. But this is not necessary, their

apologies are not justified. They are carrying coals to Newcastle. It is the very essence of the environmental theory that man is helpless in the presence of the environmental forces which happen to surround him, although the environmentalists do not seem to have observed this as the necessary outcome of their logic. On the other hand, it is the very essence of the hereditarian theory that a man has within him the power to control and manipulate environment to his desires and will. And few if any hereditarians seem to have observed this. Of course, it seems very comforting for the parent himself to believe that his child is a mere bit of clay in the potter's hand. It comforts him to think that he is the potter and can mold the child into some noble pattern of beauty and strength. But let him look at it from the child's standpoint. By this very same view which gives the father or mother so much comfort, the child is the mere victim of the situation. And just in so far as the clay-and-potter idea of human character is true, then every child comes into the world an utterly helpless, friendless piece of clay, with his character and destiny and happiness at the mercy of chance circumstances. He is the mere plaything of fate, the will-o'-the-wisp of fortune and the jest of chance and change. If the extreme environmental theory be true, then a man on his entire journey from the cradle to the grave is precisely like the lonely, broken, dismantled ships called derelicts, which drift aimlessly about the ocean. They are water-soaked and almost completely sunk from view. They are thus the terror of every sailor upon the high seas. They have no machinery, no captain, no guiding mind, no rudder, no sail, and they are bound for no port. They drift aimlessly before every wind that blows. Every current that passes by, although it has come from far-off seas, catches them in

its relentless onward flow and bears them once more to skies and seas unknown.

HEREDITY MAKES MAN MASTER OF HIS FATE

Just so it is with the human mind and body and character if the world which the environmentalists have set up be true. It may be very comforting to believe that we can mold other beings to our will, but this very belief carries as its own necessity that those beings that we mold have no will or character of their own. We who believe in heredity are convinced that this is not true. We hold a much more hopeful and optimistic outlook upon the problems of life and destiny. We believe that a man has something within him. We believe that this something is the power which the long toil of evolution has given to living beings as the very essence of life itself, namely, the power to react upon environment and mold it to the demands of its own nature. The power of the living organism to grasp and mold environment to the demands of its own structure and its own dynamics is to my mind what the life process is. I shall discuss this point again towards the conclusion of this section.

It is this characteristic of the living organism which, in my belief, makes it possible for it to have the thing which we call experience and to produce as the very essence of that experience the thing we call knowledge. If the pure environmental theory be true—while I merely assert this here and do not attempt to argue it—I believe that it makes impossible the things which we call experience and knowledge. The power to manipulate environment is the very essence of life; it is what this "fever called living" in its ultimate analysis really is; and if it, itself, be the product of environment, then environment has given

to a combination of chance circumstances called an individual organism a power greater than resides in these environmental forces themselves. It has, at least, gone beyond our conception of cause and effect.

Reducing it to simple, every-day terms, we who believe in heredity believe that just in proportion as evolution has advanced, and organisms have gained greater and greater complexity, this has given them a progressive power over their environment. This has reached its climax in man, and as we go up from the imbecile to the genius, this power over environment and this freedom from the effects of environment steadily expand. It is this which enables the normal man to rise amid almost any ordinary earthly environment and justly and rightly exclaim, "I am the master of my fate, I am the captain of my soul."

WHY SHOULD WE HAVE A GOOD ENVIRONMENT

The reader may ask, If man is master of his environment why strive to give him a good environment at all? What difference does it make whether he has a good or a bad environment? The answer lies in the very nature of heredity itself. Since it has the power to choose among environmental opportunities, quite obviously the better these opportunities are, the more numerous, the richer and more complex, the more opportunity they give for the exercise of all the potentialities of the individual's heredity. A genius among the cave men could do very little, because there was very little to do and very little to do with. A moron to-day can do much because there is much to do and much to do with. The Negro, for example, can do vastly better in America than he can in Africa. Our environment offers vastly more inducements as well as rewards for the exercise of any capacities that he may have within him. However, our environment is

too complex for the Negro to master or take advantage of all of it. I think that in this respect the best brief description of the Negro character that has ever been made is the observation of David Grayson, that inimitable philosopher of our daily life: "The Negro can do more with little and less with much than any man I know." His vast good nature, which is inborn, is almost unabated by circumstances, however untoward they may be. A very small portion of the vast luxuries of our abundant environment fills his easy good nature with the glow of satisfaction. Surroundings that seem very hard to the white man, with his more gloomy disposition and his greater demands, seem to the Negro ample sources of happiness. That is, he can do much and get much out of life with very little in hand. But this very lack of inner discontent with his environment has, in the long flow of evolution, deprived him of the very ability as well as of the passion to rise and create and master a more difficult and intricate environment. He is not equal to those higher integrative processes of the nervous system which—as Sherrington, the English psychologist, has shown—are the very essence of controlled behavior and mastery over the dilemmas presented by the environment. For this reason he can do little with much because he fails in grasping the higher complexities and consequently the higher advantages of a multitudinous environment such as ours.

HOW THE INFLUENCE OF ENVIRONMENT DIMINISHES

Now, what is true of the Negro is true of *all* levels of intelligence and temperament. It is true of all levels of organic life. In 1910, F. A. Woods published in the *Popular Science Monthly,* now the *Scientific Monthly,* an able discussion of this very point in a

paper entitled "Laws of Diminishing Environmental Influence." Woods brought out three things of very great importance, points which are frequently overlooked in discussions of the problem of heredity and environment.

This paper showed: First, that as we come up from the plant world through the low forms of life, such as the amœba, oyster, crab, to the higher forms, such as insects, fishes, frogs, reptiles, birds and mammals, and finally to the mental and moral traits of human beings, there is a regular and consistent *decrease* of the power of the environment to control the life and development of the individual. There is likewise a concomitant *increase* in the power of the organism to control, utilize and develop its environment so as to create by its own powers new environments and build new surroundings for itself.

When this fact is once stated, it seems so obvious a rule of nature that one wonders it was not thought of before. But, as Herbert Spencer, the English philosopher, pointed out and as has been confirmed by modern psychological measurement, you can pretty well tell the calibre of a man's mind by the broad general ideas which occur to him. The higher man sees, even among common facts, relationships which totally escape the common man. For this reason he arrives at those large generalizations which we call "laws" of nature. They seem quite obvious to lesser minds when once a mind of the generalizing type has discovered and stated them.

AN OYSTER THEORY OF EDUCATION

Anyone will agree, I think, that any oyster, for example, is almost entirely the product of its environment. It cannot even swim about and choose its feed-

ing ground. It has to depend for its subsistence upon the mere chance currents that bring food within its reach. It has no power to change the temperature of the water, nor to choose water of a more favorable temperature. Indeed, the oyster is almost wholly a creature of circumstance. This is precisely the view which our Behavioristic friends, and other extreme environmentalists, seem to me to hold as to the brain of a new-born child.

If, as these students maintain, there are no inborn differences among human beings; if the brains of all children when they are born are exactly alike; and if the different traits they exhibit in later life which lead us to think of one of them as John Jones and of another as William Brown, are entirely due to the environment of their early childhood, then it seems to me that we have a pure oyster theory of life and education. It seems that it would make scarcely any difference in a child's future intelligence and moral character if we should without injury remove the child's brain at birth and fill its skull with a colony of oysters. Oysters are composed of sentient tissues, and this is all that the Behaviorist seems to demand as his original stock in trade for producing either an imbecile or a genius. If the extreme environmental contentions be true, then I see no logical place to stop in the environmental theory between the oyster sucking in the passing morsel of food and the genius measuring the orbits of the stars.

Practically one hundred per cent. of the oyster's life is, doubtless, due to environment; the Behaviorists assert that ninety-five per cent. of a human being's character is due to environment. Evolution has certainly little to show for all its time and trouble if it has only produced a five per cent. difference in the power of its later creations over its earlier ones in the

mastery of environment. But it is some comfort to the eugenist to know that he has at least this five per cent. margin of organic difference to work on. If he can improve this five per cent. and make it six, perhaps he ought to be satisfied.

ENVIRONMENT DECREASES AS CHOICE INCREASES

The second feature of the environment which Woods noted in his thesis was that the influence of environment decreases with the *power and opportunity of choice* which is open to the individual. As Woods says: "This may be the chief reason why human beings, who of all creatures have the greatest power to choose the surroundings congenial to their special needs and natures, are so little affected by outward conditions. The occasional able, ambitious and determined member of an obscure or degenerate family *can* get free from his uncongenial associates. So can the weak or lazy or vicious (even if a black sheep from the finest fold) easily find his natural haunts.

"It is a point often forgotten, yet one that should be constantly borne in mind, that there are these two kinds of environment from the standpoint of an organism. There are surroundings from which there is no escape, let the creature try his best, and there are also environments from which escape is possible if the inheritant desires impel it."

We can see how this applies both to lower organisms and to human beings. When we fertilize and cultivate a plant, it has no escape from the environment we impose upon it. The oyster also, for example, has little power of choice. It cannot escape from one environment and choose another. This does not, in itself, cause the environment to have greater influence, but it does enable the environment to impose its entire

weight upon the organism. When we come to the higher animals, and especially to man, the whole drive of their lives is to search for an environment congenial to their natures. As Woods argues, a man cannot escape from the period of the world into which he happens to be born. Consequently, the kind of life he lives, the way he conducts himself, the achievements that he makes, are to a considerable extent determined by these inescapable conditions. If you and I, for instance, were in Rome, we would doubtless do as the Romans do, because there is no other way to do. A man cannot migrate from one century of the world to another. Therefore, the whole weight of the age in which a man lives he must bear upon his shoulders. As a consequence of this, the number of great men and women who appear in any one age may be due to the general conditions of the times. During a war great generals are likely to arise. A man with the military genius of Napoleon could not make it manifest in a time of peace. I imagine that if Napoleon were born to-day in America he would become a great railroad builder or king of finance. There can be little question, I think, that Napoleon was one of the greatest financial geniuses of all time. Any man who could carry on war with the whole world for twenty years and never for a single moment debase his national currency certainly deserves to be placed among the immortal kings of finance.

A man is, therefore, to some extent the product of his age. This does not alter the fact that the age is nearly always the product of the inborn genius of a very few men. It is this genius which imposes upon the masses of men an environment from which they as individuals cannot escape. As an example of this, conditions have made it hard for women to achieve distinction throughout nearly all human history. The

fact that far more women are now rising to high places of power and influence is therefore largely due to change in the world environment of modern times. But this very fact illustrates the point at issue, and that is that even with opportunity thrown wide open to all women, yet all women do not attain equal distinction. The relative achievements, the relative choices which different women make, and the relative emotional interest and capacity to make use of the available features in the environment which different women exhibit, are to an immense extent due to their differences in inborn qualities.

WHAT HEREDITY REALLY IS

The third feature of the environment in its relation to heredity which Woods notes in his paper is the difference between the *expected* and the *unexpected* environment.

For example, when a child is born, we expect for it a certain kind of environment. We expect that it will live for a number of years under the care of its parents and in contact with its brothers and sisters and other children in the community. The child's parents, grandparents and great-grandparents have gone through pretty much the same experience. There have been some changes in the world, of course, during that time; methods of transportation have changed, schools have improved, the ways in which people make a living have undergone changes, and the like. However, all the ordinary contacts of human beings with each other, such as friendliness, sympathy, conversation about their trials, troubles and hopes, the general standards of good conduct and right relationships, and what we might call the moral and mental atmosphere of the world have not been profoundly changed. As we read the Bible or any ancient book, we find that probably

eighty or ninety per cent. of the ways in which people, in its time, behaved toward each other, and the conduct and relationships which they expected from each other, were just about the same as they are now. Consequently, we would expect the children of Abraham, Isaac and Jacob to grow up about as our boys and girls to-day, if as babies they should be transferred across the centuries to our own time. The reason for thinking this is that we would expect most of the environment to be not very different from that of the olden time. They would make radically different achievements in this day, of course, just because the means of making achievements have been greatly multiplied. Nevertheless, the relative achievements which they would make to-day would be largely determined by their relative capacities.

This idea of the expected environment goes even deeper, and is indeed the very essence of our conception of what heredity is. Prof. Herbert S. Jennings, of Johns Hopkins, has brought this out very distinctly in his recent little book entitled *Prometheus*. Following Professor Jennings' reasoning, which I think states the belief of all advanced workers in biology to-day, the word "heredity" means that there are certain chemical packages in the germ-cells; that is, the first life-cell from which individuals arise. If one or a group of these chemical packages meets with a certain *expected* environment it will develop into a certain *expected* trait or function or feature of the adult organism. There are chemical packages in the germ-cells from which some people are born, which, if they meet with the expected environment will develop into, say, red hair, or brown eyes or musical talent or tuberculosis or tall or short stature, and the like. We know they will do this provided they meet the expected environment. And by this I mean they must meet the same

conditions of heat, moisture, nourishment, education, physical growth of the other parts of the body which this same kind of chemical packages met with during the lives of the individual's ancestors and other persons who exhibited these same characters. However, in this same germ-cell are also hosts of other chemical packages which will express their appropriate characters in the adult individual if it should happen that they meet with the environment which will develop them. But these chemical packages will only develop in the same way as they did in the ancestors provided that the individual meets with the same chemical, physical and educational environment that brought out these traits in the ancestors.

If, on the other hand, the individual meets with radically different conditions, why, then, some other character than the expected one will develop. It might happen, of course, that no character at all would develop. If a man does not have the chemical packages requisite for the development of hair, for instance, in the germ-cell from which he was born, he will be bald-headed from the cradle to the grave. No amount of hair tonic or beauty culture will ever enable him to cover his pate with a growth of hair. Most people will at once admit this to be a fact, and yet these same people imagine that they can administer some sort of educational or social or political tonic that will create mental and moral traits in people when there were no chemical packages in the germ-cell for those traits. The reason we believe that there were no chemical representatives in the germ-cells of such people for these desirable traits is that, as we look back into the lives of their ancestors, we find that they lived amid the same environmental agencies which brought out these traits in people all about them, yet in these particular people they did not appear.

ALL TRAITS INHERITED ALSO ACQUIRED

When we look at heredity as being this sort of thing, it loses all mysticism and becomes a definite, manageable, measurable fact. It brings it out of the realm of mystery and makes it a clear mental concept. And if it be looked at in this way, I cannot conceive of any trait or characteristic which we see in an individual—whether it be moral idealism, artistic sensitiveness, insanity, longevity, susceptibility to alcohol or malaria or to the opportunity to commit crime—that is not inherited; and I cannot conceive of any trait or characteristic that is not also due to environment, that is to say, is acquired.

When a child is born, we predict, with considerable confidence and with considerable success in our predictions after we have studied its ancestry, that it will develop into a man or woman with certain general characteristics. We are successful in our predictions, not because the germ-cell from which the child was born determines willy nilly all it shall be and become, but because we expect that the chemical packages, called chromosomes and genes, in the germ-cell from which it was born, and which are quite similar in their chemical properties and potencies to those from which the child's ancestors were born, will also develop in a very similar environment.

Consequently, when we measure a trait in a child and compare it with the same trait in its parents and other ancestors, we are not measuring heredity separate from environment, but are measuring both at the same time. We can only separate the two factors successfully when we can put two individuals of the same heredity under different environments, or else put two persons with different heredity under the same environment.

We accomplish this with encouraging success where we can study a pair of twins who are so nearly alike that for practical purposes we can assume they are identical, and who we believe from our knowledge of embryology were both born from one germ-cell and consequently have almost identical heredity, by placing them under different environments. We also reach a fair approximation to experimental conditions where sets of brothers or of sisters, all of whom were born from separate germ-cells and consequently have different heredity, are reared in the same home, by the same parents, attend the same school, Sunday school and church, have the same friends and playmates, and thus have eighty or ninety per cent. of their environment identical. This has been done in a large number of very refined investigations, and they all agree in finding the heredity factor more influential in determining one's physical make-up, intelligence and character, than the environmental factor. Prof. J. H. Muller, of the University of Texas, has recently devised some new mathematical methods for studying twins who look alike and act alike, but who have been reared apart during most of their lives. Anyone reading these pages who knows of a pair of such twins—that is, twins of the same sex, who are so nearly alike as to be a subject of common remark, but who have been separated the greater part of their lives, especially during their years of early childhood—will confer a great favor on investigators, and make a genuine contribution to the solution of the heredity environment problem—perhaps the most important problem that confronts mankind—if he will send the names and addresses of these persons to Professor Muller of the University of Texas, at Austin, Texas.

SMITH AND ROBINSON MADE BOTH ALIKE AND DIFFERENT BY ENVIRONMENT

Doctor Truman L. Kelley, of Stanford University, one of the keenest analytical minds of our time, has also devised methods of the very highest mathematical refinement and consequent accuracy for separating the heredity factor from the environment factor in the study of *particular* traits. He finds that some traits are more influenced by environment or more subject to heredity than others. The sweeping assertion often made, even by scientific men, that ninety per cent. of a man's character is due to heredity, or, as others claim, ninety per cent. is due to environment, is, thus, not justified by the facts, unless one has in mind that he is merely expressing a general average of all of a man's traits.

In discussing the heredity-environment problem, Prof. E. L. Thorndike, years ago made the penetrating observation that if the differences among men are due to *environment,* then if we could put a group of men under the same environmental influence—such, for example, as training them in arithmetic—this training ought to bring their abilities closer together, and thus make them more nearly alike.

After this is once stated, it seems very simple and obvious. Let us suppose, for illustration, that Smith and Robinson were born with the same abilities in arithmetic and the facility they manifest in these functions will be due to the environment they meet. Let us suppose that the highest achievement they could ever reach in arithmetic could be stated by the figure forty. The Behaviorists seem not to allow us to set *any limits* to what the stupidest child can be taught to do, either in solving problems in arithmetic or in the higher forms of mathematical thinking, two things which

Doctor Kelley believes are different functions of the mind. He thinks a man may be a very rapid calculator, and yet may not be able to work out the Einstein theory any better than a man who has very moderate ability in computation.

Let us suppose, next, that we find by trying Smith and Robinson out that Smith at present has an ability in arithmetic of twenty, while Robinson has an ability of thirty. We now give them an equal amount of training in arithmetic. Plainly, if they both have equal ability they will both move up towards forty, but since neither one of them can go beyond forty, they will soon be much less than ten points apart, which was the distance by which they were separated when they began. Since they can do equally well if they get the chance, and you give them that chance, they will both arrive ultimately at just about the same point, say thirty-five or thirty-eight or whatever it may be.

It would surely seem from this that if all men are born equal, given equal opportunities they will do equally well. Neither common observation nor scientific experiment up to date lends encouragement to this suggestion. Let us, however, reverse the picture of the cause of Smith and Robinson's difference in ability. Let us suppose that Smith and Robinson were *not* born with equal ability, but that Smith has a potential ability of forty, and Robinson has a possibility of arriving at sixty. We test them out as before, and find that they both now stand at twenty. If they get the opportunity and apply themselves with equal industry, it seems plain that Robinson will soon shoot far ahead of Smith, and that equal opportunity, instead of keeping them together, will separate them more widely than at the beginning.

On the face of it, the above illustration seems perfect, but Doctor Kelley has shown that it is just a bit

too perfect. He shows in his little book, *The Influence of Nurture upon Native Differences* that there are some functions of the mind where equal amounts of training tend to lessen natural differences, while there are others, in which, as in the above illustration, training tends to widen the differences. While as a general proposition equal opportunity doubtless tends to make men more unlike, yet, when we come to measure the mind—function by function and trait by trait—there are exceptions to this broad general rule. I should imagine that this is due to the nature of the different traits in question, and the fact that all functions of the mind do not operate in precisely the same way nor do we acquire learning by the same group of processes.

NEW STUDIES IN HEREDITY AND ENVIRONMENT

The nature-nurture problem is being constantly attacked from new angles. There can be little doubt that the ultimate solution lies somewhere between the two extremes. *The Year Book of the National Society for the Study of Education,* published in April, 1927, is devoted entirely to new investigations of the relative influence of heredity and environment. One important group of studies has been made for this publication by Miss Barbara Burks, of Stanford University, and Prof. Frank N. Freeman, psychologist at the University of Chicago. Miss Burks' study has to do with the problem, whether adopted children are influenced in their intelligence, as determined by intelligence tests, by the sort of parents who have adopted them. She finds that the foster parents and the home surroundings which they supply do influence, to some extent, the intelligence of the children in so far as intelligence tests can determine. Professor Freeman has studied the intelligence of adopted children as compared with

that of their foster brothers and sisters. Professor Freeman writes me that he has found that good homes and good foster brothers and sisters raise the intelligence quotient of adopted children, while bad home surroundings and foster brothers and sisters of low quality lower the ratings obtained by intelligence tests. Both studies find the non-intellectual traits more influenced for good or bad than the purely intellectual traits. All this is very encouraging to those who have adopted children with a view of improving their intelligence and character. The studies in this "Year Book" are all highly technical in character. They do not alter the positions which I have advanced in this book; namely, that both heredity and environment are profoundly concerned in the development of character and intelligence.

One of the most significant pieces of evidence recently developed in the problem of heredity and environment is that which relates to the ancestry of the one thousand gifted children that Professor Terman has studied in California. Professor Terman started out with a view of merely finding a large group of highly gifted children and studying the general characteristics of these precocious youngsters. After he had discovered these children, who were selected from the public schools solely because of their high intelligence, it occurred to him to look up the ancestors of five hundred and seventy-eight of them, in order to see if they had any distinguished persons in their family trees. To his own amazement, he discovered that some members of this group of remarkable children were related to one-fourth of the men and women in America's Hall of Fame! Scarcely one person in ten thousand of the American people has a relative in the Hall of Fame; but twenty-three of these children were related to these famous Americans.

This gives us the astonishing fact that *one in twenty-five of these brilliant boys and girls, instead of one in ten thousand,* is related to the immortal geniuses in the Hall of Fame. Personally, I do not see any way to account for the high intelligence of these children on any other grounds than that they come from highly intelligent strains of the human family. This is still further emphasized by the fact that a large number of these children were related to many other distinguished Americans who are not among the supreme few in the Hall of Fame but who have made for themselves places of credit and renown in our country's history.

THE ENGINE AND THE FUEL

There are a few, even among scientific men, who maintain that the heredity-environment problem has no significance. One distinguished biological student of heredity has stated recently that to worry about which was the more important, heredity or environment, was just like asking which was the more important in running a locomotive, the fuel or the water. He said that, since they were both essential to the engine's motion, they were thus equally important, and the question of which one was the more important had no sense to it. As Woods has suggested, the most important thing is the engine itself. The fuel and the water are expected to go with it. When a man purchases an engine, the thing he is concerned about is to get the best machinery possible. He expects to find the fuel and the water. A very slight defect in the machinery would render the best fuel and water ineffective. A slight improvement in the engine might immensely enhance the speed. An improvement in the quality of the water and the fuel would doubtless work

some benefit, but it is hardly likely it would be of as great advantage as the improvement of the machinery to an equal degree. Anyhow, fuel and water are well nigh universal, but engines are not. They are a special creation, and the great thing is to secure a good one, if the engineer wishes to do effective work.

INFLUENCE OF POVERTY AND WEALTH

Just so it is when a child is born, the important thing is the quality of the child, both its mind and body. A pretty good environment is expected, because for thousands of years in organized communities environment has been good enough for children of fairly good quality of mind and body to survive and to grow both mentally and physically, as well as morally, in a fairly orderly manner. Some children get a more favorable environment than others, but in my own judgment the differences in environment amid which it is possible for a boy or girl to survive at all are not so very great. I doubt that they are as great as environmentalists have assumed. This is because the human organism simply will not stand very great changes in environment. The limits are not so very wide apart between which the human organism will live at all. That is one phase of this whole problem which, insofar as I know, has not been measured. I do not know that anyone has attempted to measure the real differences in the environment itself. We assume that there is a very great difference between an environment of poverty and an environment of wealth. But is there? I doubt that in the actual push or pull, either mental or physical, which wealth or poverty exerts on the human organism, the difference is very great. I imagine that if we divided these broad features of the environment into a great many separate elements we should find the differences, as

actual influences working upon the organism, are not as great as the extreme environmental theory demands.

IMPORTANCE OF EARLY ENVIRONMENT

There is one point about the influence of environment upon human beings which has been a matter of common observation ever since parents had children, but the true significance of which has only recently been understood. It has always been believed that a child could be influenced more easily by environment than a grown person. This belief is entirely justified by modern science. Curiously enough, parents have not generally recognized that this principle extends down to the very hour that a child is born. We are greatly indebted to the Behaviorists, especially to their founder and leader, Dr. John B. Watson, for his brilliant experimental work on infants, which has taken this conception out of the realm of theory and placed it in the field of demonstrated fact. Dr. Arnold Gesell, of Yale, and others have also added brilliant chapters to our knowledge of the psychology of babyhood. They have demonstrated one thing clearly, and that is that the environment of the first few months and years of life is more effective and important in determining the fundamental trends and characteristics of the adult man and woman than any other period of equal length, and probably more effective than the whole remainder of life.

But it is the very success of the Behaviorist's own demonstrations which seems to me to defeat his contention that environment is all-powerful in shaping human character and destiny, and that heredity amounts to practically nothing. He proves, for instance, that the earlier in life the environmental influence can be brought to bear, whether it be fright or the development of some useful habit, the more pro-

found the effect is. He overlooks the fact, however, that at the time at which he can begin with a babe—namely, the first hour after birth—he is even at that stage working with what a biologist would regard as a very old, very far advanced organism. If the first few months of life are more important than any other period—even periods of much longer duration, possibly even more important than the whole remainder of life—then *the very long period prior to birth must be progressively more important.*

This fact has been demonstrated in experiments of Spemann and others, related by Jennings. These experiments show that where the biologist can interfere with his instruments in the very early cell stages of frogs and salamanders, he can work changes which in the adult organism become truly astonishing. For example, when a frog begins to grow, the first cell divides into two. Ordinarily one of these cells develops into the right half of the frog's body and the other cell develops into the left half. But if these two cells are separated, each one develops into a complete frog. Likewise there are certain salamanders which ordinarily have two eyes, one on each side of the head. But the cells can be manipulated at the beginning in a very technical way so that a salamander is produced which has only one eye in the middle of the head.

Now, if the environmentalists could institute such violent interferences as these with the first few cells which at the beginning constitute a human being, or at least a potential one, then their claim that environment is all-powerful and that they might make any child into a genius or an idiot, a saint or a gallows bird, would, I think, be entirely justified. However, these very experiments demonstrate the enormous significance of the element of time and the stage of development in making environmental interference effective.

They demonstrate that it would take a vastly higher technique than now seems within easy attainment to work such changes upon organisms so comparatively simple as frogs and salamanders, when they had reached anything approaching the stage of development that a babe has reached when it is born. The achievements of development are so rapid and are so solidly maintained that it certainly does violence to a biologist's conception of the alterability of organismal growth to believe that education or differences in social status, wealth or poverty will profoundly change the structure and function of organisms as old as babes are when they are born. The Behaviorist's own demonstrations indicate that the very portion of the life of the organism which he needs to get at, in order to make good his claim, is the very portion he cannot get at. He claims he can make a stupid, slow but normal child, from generations of stupid, slow, thriftless, socially unsuccessful but normal parents, into a dynamo of energy, a walking cyclopædia of learning and an angel of moral character. Yet, by his own theory the very portion of life which he needs in order to demonstrate this fact he cannot get at, and during this supremely important period the environment of all human beings is probably at least ninety per cent. uniform. It is probably ninety per cent. uniform, at least, in so far as any pedagogical processes are concerned.

EDUCATION TO BECOME MORE IMPORTANT

I imagine that environment and education will become much more effective as the psychologist reveals more and more the groundwork of life contained in the months of babyhood. It may be ten times as effective. But, even if so, I cannot see that it will do any more than draw out and emphasize the differences in char-

acter and intelligence with which babes arrive in this world. And I think there is evidence that these differences even at that point are considerable. If environment be as powerful as its enthusiastic friends proclaim, then it ought to be able to take two individuals, who *now* differ widely, and make them much more nearly alike. If the differences between John Jones and William Brown are due chiefly to differences in environment, then the advocates of this theory ought to be able to put them in a common environment and soon make them alike again. If it be claimed that they are too old and their nervous systems too set and tough to alter, it ought at least to be possible to take their children and make them alike. Maybe, but nearly all educational experience indicates that precisely the opposite would be the result. The more we educate human differences the larger those differences become, with the exceptions which Doctor Kelley has noted. If we could, for example, educate a tall man to be taller and a short man to increase his shortness, they would in the end be farther apart than ever. And it is this general trend throughout nearly all education which is to me one indication, at least, that the larger share of the differences among men is due to nature and not to nurture. Kelley has shown that with a few traits similar training of two individuals possessing these traits will tend to decrease the differences, but with a majority of traits the differences are increased by similarity of training.

OVERCOMING YOUR HEREDITY

However, just because all traits are due both to heredity and environment, just because no trait or character will manifest itself unless it meets with the expected environment, it follows that one does not necessarily have to exhibit a trait even if he has

inherited it. In a lecture delivered in 1909 I said on this point: "If you have inherited a thing, that does not necessarily mean that you have to show it. No characteristic will develop unless it has the appropriate environment. Most people imagine that when it is said that tuberculosis or insanity is hereditary this means that a person who has inherited this disease must necessarily show it. The average person, indeed, fights the idea of heredity, and even many of the medical profession fight it, because they imagine that heredity is some sort of relentless fate. Especially they imagine that if a disease is hereditary there is no escape from it; that if it is in your family, you are sure to have it, and that there is practically no use trying to cure it. It is just hereditary, and they suppose that means it is inevitable and also means well-nigh certain death.

"Heredity is nothing of the sort. Everyone inherits a great many things which he never discovers and which no one else ever discovers, just because there has been no environment to bring this particular feature of his heredity to expression. A child may have inherited a high susceptibility to tuberculosis in the State of New York or Maine where he was born. But if by chance his parents removed to Arizona, he might never discover the fact that he had inherited tuberculosis at all. Likewise, there are many forms of insanity which are distinctly heritable traits. Yet if one can secure a wise physician who understands the mind as well as the body, and will live a quiet, controlled life, he may entirely escape the manifestation of this hereditary character. Many a college student has inherited great ability for mathematics, but very often he has a seemingly miraculous power to prevent this hereditary character from coming to any notable expression."

REPUTATION AND CHARACTER NOT THE SAME

A great many people argue that environment is the chief factor in human destiny because they can cite numerous special instances where some men have become famous apparently by accident. This does not meet the real requirements of the problem, even if it can be proved to be entirely true. Such persons are confusing the worldly fortune of a man with the actual character of the man himself. A man may become famous without his having changed his character in the least. An actress or opera singer who has become famous over night, after some grand début, is the *same person* she was the day before. The problem of heredity and environment is only secondarily a problem of the worldly position of a person; it is primarily a question as to just how much a man's surroundings, the education that has been given to him, the books he has read, the people he has conversed with, the job he has to work at, the amount of money he has in his pocket, and similar outside things, have changed the man himself as a human person.

All these outward possessions and activities are indications of one of two things, either that the man has sought them or else they have been forced upon him. Those that have been forced upon him are matters of pure chance, such as being born rich or poor or the like. And whether one finds these things after searching diligently is also a matter largely of chance. However, the inner urge to seek for them and to gain benefit or receive damage from them is largely determined by the nature of the man. Fame is often a matter of mere accident, but intelligence and moral character are not. The opportunity to use intelligence and the incentive to develop moral character are practically universal. These things are always and everywhere. They al-

ways will be everywhere. They are the expected environment for all men. And while the particular achievements a man makes, whether he drives a plow as in olden times or drives an airplane as he may do to-day, whether he remains obscure or becomes famous, remains poor or secures wealth are to a considerable extent determined by the time of the world in which he is born, the country he is born in, the schools, industries and tools that are provided for him; yet I think the actual kind of a person a man is among his fellows is not profoundly altered by these environmental differences. A man can be kindly anywhere, he can be honest anywhere, he can be ingenious anywhere. We commonly think that a man will be more honest if we place him amid richer surroundings. In some cases he will be; in others, these things only make him more dishonest, give him more opportunities to lie and steal and throw him in the midst of relationships so complex that they are too much for his intelligence and temperament to negotiate with proper adjustments.

Morality is merely adequate and effective adjustment. And this depends upon intelligence more than upon anything else. And intelligence is a thing with which different men are born in different amounts; these fundamental amounts are only to a moderate degree changed by education. To sum it all up, then, while it is not altogether true, yet it is probably more nearly true as a generalization of the whole problem of heredity and environment than any other one statement of the case, that in every situation of life, as the old saying goes, "A great deal depends upon the man." The trend of modern inquiry, at least so it seems to me, justifies the belief of the student of eugenics that more depends upon the man himself as nature made him than upon anything else.

I have made this extended excursion into the heredity-environment question merely that the reader may feel considerable confidence that heredity makes a difference—indeed, a very great difference. If this be true and if mental and physical traits are both inherited, then it makes a great deal of difference what kind of parents a man has, and what kind of people are born. A man cannot choose his parents, but his parents can choose each other; and in the choice of each other the pedigree which records the heredity of each matters a great deal.

The chief point, however, from the standpoint of eugenics is that if it be true that some people have better heredity than others, then if economic conditions, social and intellectual ambitions, general ideals or wrongly directed birth control should lower the birth rate of those who have good heredity and leave undiminished the birth rate of those with mediocre or positively bad heredity, the average intelligence, physique and moral character of the race are going down. But if we can induce good, healthy families among good, healthy people, and reduce the birth rate at the other end of the scale, the case for eugenics is largely won. To bring about this condition is the hope of eugenics.

THE SECOND CORNER STONE OF EUGENICS

The second corner stone of eugenics, is *the non-inheritance in any large, wholesale way of what is commonly called "acquired" characters.*

I doubt that any question, short of Fundamentalism, has had as much muddled thinking bestowed upon it as this. It has long seemed to me that the discussion of the problem of the transmission of acquired or induced characters—in the way, at least, in

which a great deal of the discussion has been carried on—is to a considerable extent a logical blind alley. If you mean by the term an "acquired" character that you are going by some manipulation of the environment to set up or create or release some new potency in the germ-cell—which potency under the environment which you have induced or which is already present will develop into a new character in the organism—and *then* expect that this new character will continue to reappear in coming generations *after your original stimulus from the environment and the environment amid which your new character first developed and which caused it to develop is withdrawn,* it would seem that you are reasoning in scientific, instead of theological, jargon as to how many angels can dance on the point of a biological needle. As we have already seen, all characters are acquired through the influence of the environment in every generation while at the same time they are due just as much and probably more, to the chemical agencies in the germ-cell. If either of these agencies is not present for each and every character in the organism in every generation, then the characters will not develop.

ACQUIRED CHARACTERS DEFINED

To suppose that some push might be given either to the body or the germ-cell of the organism which would cause a new character to appear in the offspring; and to suppose that this new character will go on willy-nilly under its own power down the generations after the original push has been withdrawn, is at least straining our ideas as to the very little part played by the environment in each generation in bringing the characters of the organism to their full development. One can conceive, of course, that this special push has altered

the atomic structure of the germ-cell, and that this will alter the potency, as we should expect it would, of the chemical representatives of the adult characters in the germ-cell. That this can be done or has been done is only a conception and is going beyond anything of which we have at present experimental proof, although we do have a number of authentic experiments which indicate that this sort of change has been induced.

We can picture in our imaginations that the physical or chemical structure of the germ-cell could be so altered that a character appearing heretofore under the influence of the environment which had obtained would no longer appear, even though the appropriate environment were still present. In other words, the loss of a character apparently might be brought about; and this probably has been accomplished by a number of experimenters. This would probably be not only much easier to accomplish from the mere standpoint of experimental technique, but it would likely be an experimental undertaking of quite a different order. For if we knock a character out of a germ-cell it is highly improbable that the environment which has heretofore been bringing it to expression, when the appropriate chemical conditions in the germ-cell were present, would recreate it and cause it to appear again when the original chemical conditions in the germ-cell were absent. At least, in knocking a character out of a germ-cell the experimenter is not concerned with the future environment. If the character be once knocked out, the environment can be pretty well trusted to keep it out.

But in creating a new character this character would have to appear in the first generation, under the influence of two factors: first, the push or pull of the environmental agency which set up the new physical or chemical potencies in the germ-cell; and, second, the

environmental conditions either in the remainder of the organism or in the general medium of nature which bring this new character to its expression. It might be possible that the experimenter could depend upon the indefinite continuance of this appropriate and expected environment which brought his new character to expression. But he is also expecting the change to *continue in the germ-cell* after his environmental agencies which caused it have been withdrawn. This may be a trustworthy assumption, but, if so, it would seem to me to assume that, whereas, the processes of development will not go on in the organism except under appropriate environmental conditions, yet they will go on in the germ-cell. Possibly so. My only point is that I believe it lacks at the present moment ample experimental proof.

If these considerations have any logical consistency, they suggest, at least, that it would be expecting a good deal from any educational procedures (such as teaching rats to find their way through a maze at the sound of a bell, with the objective in their minds of attaining a piece of cheese at the other end) to believe that they would fulfill *all* of these conditions.

My sole point is that, from the standpoint of direct race improvement, these considerations and technical difficulties make it seem rather fatuous to believe that some shift in the distribution of wealth or hours of labor or transfer of social, economic and political power from one class to another such as Socialism suggests; or an improvement by psychoanalysis of the particular dreams which the Freudians claim each race of people indulge in while they are asleep (whether these dreams be due to disordered stomachs or sex complexes); or that the teaching of Egyptology or Latin grammar, such as some educators suppose is improving the germ-cells as well as the brain-cells; or

that the prohibition of alcohol for a few generations, such as the prohibitionists expect to provide, will work any very profound changes either for better or worse in the organic make-up of mankind.

MEASLES AND ALCOHOL

As an example of the popular faith in the direct improvement of the human race by education or legislation, one of the chief claims as to the benefit of prohibition is that, if only we can keep alcohol away from our young people for two or three generations, the taste and liking for it will disappear. They claim that this enforced abstinence would in a few generations produce a race of men who would find no greater pleasure in the finest wine than in a good quality of water or beef-broth.

Such persons display in the first place an exhaustive ignorance of biology and heredity, and also overlook such obvious disproofs of so fanciful a theory as that of the Indians in America when the white man arrived. None of the Indians had surely imbibed any alcohol since the days when they left China and migrated by way of Siberia and Alaska into America, as Doctor Hrdlicka has shown they did. Yet the moment they tasted alcohol, they proved to be natural-born drunkards almost to a man. And in recent times we have had to set up the most rigid surveillance, enforced by powerful military police, to prevent the noble red man from drinking himself into extinction. It seems from this that prohibition, if it works, will increase the taste for alcohol, and actually force us by legislation to become a nation of potential drunkards. Certainly, the evidence to date runs mainly toward this conclusion and not the opposite. It is quite conceivable that prohibition *might* so strengthen the desire for alcohol that it would break down of its own

weight in time and sweep the race with universal drunkenness.

It is highly probable that the Indians' drinking was a biological phenomenon of the same sort as that which occurred when measles struck the Tasmanians in the South Seas. Not a single man in this race, endowed as they were with unusually fine physiques, proved to be immune from this microbe. It affected them all in a deadly form. As a consequence the last Tasmanian died, but a few years ago, from this devastating malady. Had a single couple survived, they would have doubtless bred a new race, endowed with a natural ability to withstand this disease producing organism. Other races had long ago undergone this experience, and a few proved immune from a deadly onset. Consequently, we rarely have a death now from measles.

Had we been able to devise some medical treatment that would have kept the Tasmanians from dying when they were attacked with measles, this would evidently have continued the race. But it seems just as evident that, since those we had to preserve by medical means would marry and *reproduce their susceptibility to measles,* this susceptibility would be by our very preservative measures, carried on as a permanent characteristic of the race. When men first drank alcohol, for instance, and a lot of them died, the medicine men and prophets doubtless proclaimed that the race was about done for. Further experience, however, probably demonstrated that it was only the weaker and more susceptible ones that died, while those with greater resistance to the effects of alcohol or greater moral self-control survived. The race withstood the shock and entered a new and probably higher plane of evolution. As the biologist puts it, the race underwent an "evolution against alcohol." It may be

that, from the beneficent effects of prohibition, we are now undergoing a similar evolution against wood alcohol, French perfumery, spirits of ammonia, strychnine and fusel oil. Whether this will improve the race in its natural gentility, social capacity and obedience to law, remains to be seen.

LOST HEREDITY NOT REPLACED BY EDUCATION

Whatever may be the ultimate solution of the problem of acquired or induced characters—a solution which would certainly reveal to us many of the secrets of evolution—it seems patent that at least it is extremely difficult to modify the germ-cell and thus modify the race in a satisfactory and continuously constructive direction. The fact that we cannot very easily modify the germ-cell and thus change the inborn heredity of the race to any great extent by education points to three very important considerations for eugenics:

First, the fact that we cannot produce desirable traits to order by any procedure now known means that if any of the desirable traits which the race now possesses are lost by the fact that those persons who possess them do not have a sufficient number of children to carry these traits on down to future men and to future society, we cannot readily replace these lost treasures of evolution by education or by any improvement in environment.

BEHAVIORISTIC FATALISM

Of course, if it be true, as the environmentalists claim, that ninety-five per cent. of every man's character in every generation is due to his surroundings and education, then there is no need for eugenics. The

race in that case is plenty good enough for all practical purposes; the eugenist gives up his case, throws up his biological sponge, and retires from the field. It happens, however, that I have not become sufficiently convinced that the conceptions of science are in themselves the criterion and the revelation of ultimate reality, nor have I seen sufficient experimental proofs from the Behaviorist's laboratory to enable me to share with him his fatalistic and hopeless belief that man is a mere bit of protoplasmic mechanism thrown by the law of chance distribution upon a boundless sea of fortuitously distributed circumstances, with no power within himself to choose the stars that may guide his course or to select the haven at which he shall at least labor to arrive. It seems a bit anomalous that, if the mechanistic contention be true—namely, that purposive striving is impossible—the mechanist should strive so hard to prove his own case. Prof. William Wheeler of Harvard has shown that Doctor Watson is by no means, as is commonly maintained, the founder of the science of studying animal behavior *as a whole* without including the assumption that this behavior is conscious. Yet Watson announced recently that the last philosopher was dead, that Behaviorism had solved all the problems of mind and matter, consciousness and reality, and that from now on men could dispense with this idle plaything which has so long amused them, namely, philosophy.

As my friend, Dr. Donald A. Laird, psychologist, of Colgate University, remarked to me recently in substance, Doctor Watson is himself one of the great philosophers of our time. He has taken a small handful of brilliant and entirely valid experiment, and, upon this meager basis has erected a complete philosophy of mind and consciousness, life and destiny, reality, and the nature of the universe itself.

At the very best, until the environmentalists furnish us with a number of examples of great actresses whom they have produced from persons heretofore considered to be dumb-head chorus girls; of great writers from persons whom our best pedagogical methods could not teach to read until they were eight or ten years old; of astronomers from children who, by the age of twelve, could not be taught, by any method now known, to count up to fifty without error; of great geniuses in war and government from persons who had never been able, by our ordinary methods of education, to learn to manage a go-cart intelligently; until then, I think, the eugenist can safely proceed in his efforts to improve the hereditary material of the race upon which education and environment can exert their undoubtedly effective and beneficent work.

EDUCATION AND RELIGION FORTUNATELY NOT INHERITED

The second result of the non-easy inheritance of acquired characters is that it prevents the future natural characters and intelligence of man from being the fantastic creations of whatever cult or system of dogma happens to rule at the moment in human education. A great many people write to me pointing out how unfortunate it is that educating the parent does not improve the natural characteristics of the children. They think this destroys all hope of improving the race. Quite the contrary; it is one of our chiefest hopes for bringing about permanent race improvement. For, plainly, if good education were transmitted, bad education would also be transmitted.

A woman just wrote me that she would be in despair if she thought that cultivating a religious life in herself would not cause her children to be born with better moral and religious natures. I replied to her that it

was extremely fortunate that none of the results of her religious training and efforts would be inherited by her children. I urged her to reflect that while she thought that she had the one true religion, yet there were about a hundred other sects and denominations, many of them quite opposed to her beliefs, all maintaining that they also had discovered the one and only way to heaven. The Roman Catholics and the Protestants do not agree in their religious views. They slaughtered each other, with perfectly clear conscience, for one hundred and fifty years during the Reformation, each one trying to prove by this method that his religion, if not the only one, was at any rate the best. The Protestant would doubtless regard it as quite fortunate if the Catholic teachings were not inherited by the children, while the Catholic would be unhappy and probably feel that the race was deteriorating if the religion of the Protestants was constantly being intensified by being transmitted by heredity to the children. The religious temperament is no doubt inherited; but fortunately, religious teaching and training are not.

It is obvious that education of some sort, mental influences of one kind or another, are being exerted upon every human being always and everywhere. If a set of influences which we think of as good were transmitted from parent to child, certainly all bad influences would be transmitted just as strongly. You might be teaching your child lofty religious sentiments, while down in the slums old Fagins are teaching thievery and murder to poor little Oliver Twists. If your fine religious sentiments are fixed in the brain of your child, and then transmitted on to your grandchildren, it is equally plain that old Fagin's murderous spirit will be transmitted through Oliver Twist and the Artful Dodger to their children and grandchildren. Fortunately, the germ-cell is not a sieve which filters

through to the next generation the influences which you happen to think are good and keeps back what you happen to think is bad. The views as to what is good and bad are constantly changing, and they are different among different groups of people. Fortunately, therefore, the germ-cell stands as a very difficult barrier to prevent the passage of any kind of educational influence from one generation to the next. For this reason we can quite safely count upon the fact that the inborn traits of future men are not going to be the grotesque and preposterous concoctions of anybody's ideas of pedagogy, philosophy, religion or politics. It seems peculiarly fortunate that the idiotic experiments which we have performed, and are still perpetrating, upon children, in the name of education, are not going to be transmitted as the inborn characters of future generations.

HEREDITY DEPENDABLE—ENVIRONMENT NOT

The third result of the fact that the germ-cell is a very hard barrier to pass and that education does not readily go through it to the next generation is that this makes heredity an extremely dependable thing. Let us imagine that the stream of heredity which is carried in the germ-cells from generation to generation were extremely unstable and could be changed by all sorts of modifying influences. Let us imagine also that this stream of germ-cells, which the biologist calls the "germinal stream," were like the Hudson River which runs from Albany to New York. It bears an immense amount of traffic from one city to the other. But suppose that the various schools and colleges that are located on the banks of the Hudson could change the course and character of that portion of the river immediately in front of their campuses. Some of them would want the river to be blue, some green, some

would want it frozen in midsummer and open in midwinter, some would want it filled with landscape gardens, others with aquatic animals, and so on, indefinitely. It is obvious that traffic would be impossible. The very finest passenger boat loaded at Albany with the best and noblest people in the world would never be able to land them in New York and spread their beneficent influence in that city.

This is a very homely and incomplete illustration, yet it does bring to mind a fairly good picture of what would happen to the human race if the germinal stream could be constantly changed by environment and education. To put it in common parlance, too many cooks would spoil the broth. It also illustrates the fact that if the germinal stream cannot easily be changed we can have a great deal of faith that the traffic we set going upon it will reach its destination without disaster or radical alteration. In other words, it is the very difficulty of modifying this hereditary vehicle upon which man's mental, moral and physical traits are carried down the stream of time that gives us a justifiable confidence that, if by any method, we shall succeed in improving the human race, it will remain improved long enough, at least, for us to bolster up our improvements and thus sustain our gains. The human race certainly had a pretty bad environment for several centuries after the fall of Rome. The environment of the common people of Russia has certainly not been ideal for a number of centuries. It is probably far from ideal yet. But these long periods of Dark Ages, when scarcely any education was available for the masses and when life was hard and bitter and often brutal, have not made the race into imbeciles, neurotics or cutthroats. Selection, of course, has been at work and has changed them to some extent. The forces of evolution never slumber nor sleep. But the majority

of people remain about as they were, kindly, passionate, good-hearted, moderately intelligent folks from whom now and then by a chance combination of marriages—that is, a chance combination of germ-cells—there arises a leader and a genius to carry them forward another stage on the highway of progress. It is, therefore, evident that the difficulty of modifying the germ-cell is one of our chiefest sources of eugenical hope.

THE THIRD CORNER STONE OF EUGENICS

The third corner stone of eugenics is, in my judgment, the fact that *good qualities tend to be associated with one another in the natural make-up of men and women.* To put it a bit more correctly, there is a positive and not a negative correlation among the desirable traits of human beings. The chiefest of these positive and healthy correlations is, I think, the tendency for intellect and moral character to be found associated together in a majority of persons—that is, they will be found to exist together more often than the opposite condition.

This means that if a man has any one good trait in a considerable or high degree, we can expect, as a rule, that he will have a great many other good traits associated with it. He may not possess these other good traits in quite as high degree as his most significant one; but he will, as a rule, possess more of them than other persons who do not possess his most significant trait.

LAW OF COMPENSATION NOT TRUE

The notion that nature "compensates" a man by giving him bad traits to balance his good ones, and good ones to make up for his bad ones, has doubtless

been greatly emphasized in the minds of many people by Emerson's famous essay on "Compensation," in which he announced that this was the law of nature. Emerson himself was merely voicing popular impressions and mystical beliefs that have grown up in Oriental religions. Neither he nor anyone else had at that time ever given the idea any critical examination. As a matter of fact, the truth lies in the opposite direction.

Professor Thorndike announced in his *Educational Psychology* in 1910 (and possibly earlier) his belief that all mental traits tend to be correlated; that is, the good are more often found associated with the good and the bad with the bad. Owing to the very great importance of this principle in general evolution and its special application to eugenics, I repeat here an oft-quoted passage bearing upon this point from Professor Thorndike's *Educational Psychology:*

"The significance of the relations between mental traits which have been measured in this way is seen most easily and clearly by observing the doctrines about individual psychology which they disprove.

"First may be mentioned a series of beliefs in mental antagonisms or compensations. Such are: That superiority to the central tendency in vividness and fidelity of imagery of one sort implies inferiority to the central tendency in vividness and fidelity of imagery of other sorts; that superior ability to get impressions through one sense is related to inferiority in getting impressions through other senses; that intensity of attention varies amongst individuals in opposition to breadth of attention, so that a high degree of power to attend to one thing at a time goes with a low degree of power to attend to many things at once; that the quick learner is the poor rememberer; that the man of great artistic gifts, as in music, paint-

ing or literary creativeness, is weak in scientific ability or matter-of-fact wisdom; that divergence above the mode in power of abstract thought goes with divergence below the mode in thought about concrete things; that the man of superior intellect is likely to be of inferior mental health; that the rapid worker is inaccurate; that an agile mind goes with a clumsy body; etc., etc.

"Not all of these and other supposed antagonisms or inverse relations have been specifically tested by the calculation of the appropriate R's (degrees of resemblance); but those which have been so tested have been found in gross error. . . .

"Cattell ('03) finds that eminence in artistic lines implies superiority in politics or generalship or science more often than the reverse. All relevant measurements witness to a positive correlation between efficiency in thought with abstract data and efficiency in thought with concrete data; also between the ability to work with a greater speed at a given accuracy, and the ability to work with greater accuracy at a given speed. Indeed, the individual who works at higher speed often works more accurately at even that higher rate than does the slower worker at his more favorable rate."

GOOD TRAITS ARE CORRELATED

All this means, of course, that common impressions, such as, for example, that persons born blind have a finer sense of hearing and touch than ordinary people; or that persons of high ability are more likely to go insane than stupid or mediocre persons; or that persons of great musical ability are lacking in common sense; or that persons who have great ability to make money are lacking in power to appreciate art and beauty, are wrong. Of course, people who have great

abilities frequently concentrate their energies along the line of least resistance; that is, along the line of their highest group of abilities. Especially do they do this if they have opportunity and encouragement, and discover in early life what their best abilities are. As a consequence, they do not *develop* their other abilities so highly as the ones to which they have devoted their main energies and attention.

But, as Thorndike points out elsewhere, the ten greatest generals of the world would likely be considerably better poets than the average man. They would not rank with the great poets, because the great poets have developed their best abilities and the great generals have developed theirs. There can be scarcely any doubt from this principle that, notwithstanding the general belief that poets are lacking in what is called practical horse sense, ten well known poets would make better generals than ten men whom you would pick out at random as you walk along the street. While a personal observation upon a scientific matter is not of much value, let me say it happens that I spent a portion of last evening conversing with three of America's conspicuous poets, Edgar Lee Masters, Percy Mackaye and Robert Schauffler. They impressed me as being men of much greater common sense and practical wisdom than we find among the general average of men. I should, at least, be willing to wager on them as military leaders in a national emergency in preference to three men just picked out at random at the county fair, or any other unselected gathering of people.

SOME GOOD TRAITS NOT CORRELATED

There is a technical sense in which this principle of the correlation among mental traits is not altogether correct. There are certain traits that do not tend

universally to be associated with each other. As the statistician would put it, they "correlate to zero." This means that there is no tendency for them to be found bound together in the general run of the population. This fact has recently been worked out by Doctor Truman L. Kelley by very technical methods. I shall refer to this in the concluding section, since it bears upon problems of eugenics and evolution. However, good traits do not indicate that they are compensated with bad ones, nor bad ones with good ones. The general tendency, however, is for both desirable and undesirable traits to be grouped in separate individuals. They are neither collected at random in individuals nor are they brought together by nature as opposites.

In the early years of this century the degree of correlation among a number of mental traits was worked out by various investigators. Professor Pearson of England also worked out a number of correlations among physical traits. He showed, for example, that a man who has long arms tends to have long legs. Nature does not compensate one good physical trait by balancing it against a poor one. Even our crude newspaper humorists, Mutt and Jeff, seem to have reflected upon this phenomenon; on one occasion little Jeff explained to Mutt that he believed in Emerson's law of compensation, as he had often observed that if one of a man's legs happened to be too long the other leg was always too short.

The whole upshot of the matter is that the products of evolution are logical. The human body as well as the human mind is a logical development. For this reason anthropologists are able to take only one or two bones of a prehistoric man and construct a fairly faithful likeness of the whole man. In this way Dr. J. H. McGregor, of the American Museum of Natural

History, has made some wonderful reconstructions of the men of the Old Stone Age, to illustrate the lectures of Dr. Henry Fairfield Osborn upon the life and structure of these prehistoric races.

BRIGHT PEOPLE MORE MORAL

However, the first demonstration of the close relationships among man's characteristics was made by Dr. F. A. Woods in his book, *Mental and Moral Heredity in Royalty,* published in 1906. In his research he proved that the large, general, moral traits of men are linked with their intellectual traits. The importance of this discovery may be judged by the general reader by a remark which Professor Thorndike made shortly afterward in a lecture on psychology. Thorndike spoke as follows (I have not the original lecture at hand, and therefore quote from memory): "The man who proved that mental and moral traits are correlated has made a greater achievement than the winning of any battle in the history of the world." I recited a few of these facts in my *Fruit of the Family Tree,* but my purpose there was entirely different.

Woods examined the lives of six hundred seventy-one of the kings and queens and their sons and daughters, covering five or six hundred years of European history. He rated them by elaborate methods on two separate scales, one for intellect and one for morals. Each scale had ten graduations numbered from one to ten. The surprising and wonderful thing is that those rated in the lower grades for intellect usually rated in the lower grades for morals. On the other hand, those that were most celebrated for intellectual achievements were, as a rule, most highly praised by historians for their moral character. There were some exceptions, of course, to

this rule. Such persons as Catherine II of Russia and Frederick the Great of Prussia were high for intellect but low for moral character. But such persons as Gustavus Adolphus, Gustavus Vasa, William the Silent, Henry IV of France, William III of England, Alphonso X of Portugal, Ferdinand and Isabella of Castile and Aragon, and many others, were just as renowned for their rich moral natures, their passionate devotion to the welfare of the people and their humaneness of disposition as they were for their military, political and diplomatic achievements. Of course, it is commonly believed in this country that the royal families of Europe have been a poor lot mentally, physically and morally. But Woods' study showed that among this group, numbering all told about eight hundred persons, nearly all of whom were more or less related to one another, there were at least twenty men and eight or ten women whose ranking among the shining geniuses of human history will never be questioned. Nothing has ever impressed my own mind so deeply as to the staggering power of heredity in the production of human character and intelligence. What makes it all the more impressive is that Woods submitted strong evidence to indicate that the exceptional achievements and lofty personal virtues of the royal persons were not the products of their exceptional rank and power, but that their exceptional rank and power were, in the main, the products of their natural strength of intellect and character.

EVOLUTION DUE TO PROGRESSIVE CORRELATION OF TRAITS

If we take into consideration the general theory of evolution, we are bound, it seems to me, to expect desirable traits to be strongly associated. If, for example, a man who had a long, strong right arm, was just as

likely as not to have a short, weak left one, or if a man who had a strong backbone had just as good a chance as not of having short, weak ribs or short, weak thigh bones, it is evident that evolution could never proceed at all. Living plants and animals would be mere grotesque assemblages of unrelated structures and functions. It is a belief of my own that the stage of evolution of any species might be roughly measured by the degree of correlation among its desirable mental and physical traits. I believe it might be maintained that this correlation has risen steadily as evolution has progressed. I know of no exact measurements of this, but it would probably at least repay inquiry. The giant forms of early times, such as the pterodactyl and the dinosaur, impress one upon general observation as being rather loosely put together, with a lack of highly logical correlation among their organs and functions. This fact has never been so delightfully expressed as it was by the late Bert Leston Taylor, the beloved columnist of the *Chicago Tribune,* in his poem entitled *The Dinosaur.* Mr. Taylor's poetico-paleontological reflections upon this prehistoric monster were as follows:

"Behold the mighty Dinosaur,
Famous in prehistoric lore
Not only for his weight and length
But for his intellectual strength.
You will observe by these remains
The creature had two sets of brains—
One in his head (the usual place)
The other at his spinal base.
Thus he could reason *a priori*
As well as *a posteriori.*
No problem bothered him a bit;
He made both head and tail of it.
So wise he was, so wise and solemn,

Each thought filled just a spinal column.
If one brain found the pressure strong,
It passed a few ideas along;
If something slipped his forward mind,
'Twas rescued by the one behind;
And if in error he was caught,
He had a saving afterthought.
As he thought twice before he spoke,
He had no judgments to revoke;
For he could think without congestion
Upon both sides of every question.

O gaze upon this model beast
Defunct ten million years at least!"

Certainly, evolution has been a progress towards logical unity, resulting in greater economy of structure and greater facility of locomotion. I do not wish to strain a point, but it would seem a suggestive thesis that any organism which varied in the direction of a greater logical unity in its structures and functions—that is, a higher correlation among its desirable traits—would be able to negotiate survival more successfully than an organism which failed in this achievement. I imagine that if such a progress in degree of correlation does exist it would be found to be more marked in physical than in mental traits, because the mental traits are more recent, and physical correlation in excellence were the first conditions of survival. When comparative anatomy and comparative psychology have progressed another decade or two we may be in a position to see whether there is any validity in this suggestion of progressive correlation.

A NEW METHOD OF MEASURING HEREDITY AND ENVIRONMENT

Even if the foregoing suggestion should prove to be purely fanciful, I believe that the correlation among

mental traits could be utilized in a new method of attack upon the problem of heredity and environment. This seems to me a point which has so far been overlooked. My suggestion is, that the correlation among the traits of an organism would seem to indicate, on the grounds of probability alone, that these traits are germinal and not environmental in origin, that is, due to heredity more than to environment. It would appear to be hardly probable that the chance distribution of environmental influences, which are not in any high degree causally related to one another, would assemble the majority of good traits in one individual and the majority of bad ones in another. Furthermore, it strains our conception of the nature of probability to suppose that these traits would be assembled in an individual in approximately the same ratios and to approximately the same degrees in which they were assembled in his ancestors. These ancestors have often lived in environments in which the large general factors at least were quite measurably different from those in the environment in which the present individual lives. In many cases the relative impact of these environmental agencies on the ancestors and upon the descendants has not only not been the same, but has been completely reversed.

I am inclined to believe that some studies of the heredity-environment problem could here be made on new lines, with a promise of fruitful results.

MORALITY AND GENIUS

The hopeful thing which results from the discovery that the good traits of men are linked together in their hereditary constitution is that if we can improve man in any one trait which is socially desirable we can safely count on improving his nature all round. This

seems to me to answer for all time the criticism often made against eugenics that most men of high ability and most geniuses are immoral, and are, therefore, socially unadaptable. It also meets a second common criticism of eugenics that if the race could be induced to select husbands and wives for intelligence, we should thereby create a race of brilliant scoundrels.

This notion that men and women of high ability are usually persons of low character is so widespread, the few immoral geniuses of history and the few great men who have had ill health such as insanity or epilepsy have been cited so often by shallow critics of eugenics, that I feel constrained to call attention to some evidence to the contrary. The majority of people express great surprise on learning that on the average intellectual people are better morally than mediocre and stupid people. The belief is very common that in order to be good you must be very stupid. I have found from numerous interviews that many highly educated people actually believe that a boy of exceptional brightness is in much greater danger of becoming a jail bird or a degenerate than if he did not show these dangerous (?) signs of mental precocity.

When some widely known man goes wrong or is accused of drunkenness, the expression we usually hear is, "Why, what else could you expect of a genius?"

Whenever a musician, an artist, or writer runs off with some other man's wife and forgets to bring her back, people usually say, "Well, you know those people of genius lead such immoral lives anyway. They call it artistic temperament. But that's no excuse; they ought to be punished just the same as common folks. But then, you know, geniuses are irresponsible."

One little oversight in such opinions is that people

fail to notice how many ordinary folks do the same things. A little examination easily proves that ordinary folks run off with each others' wives and husbands and *do all sorts of stupid immoral things more often than do people of genius.*

Men and women of ability, talent, and genius are the most moral and virtuous persons in the world.

CREATIONS OF GENIUS

All our high notions of morality, character and righteousness are the products, the creations of genius, and not of stupidity.

"The good old-fashioned virtues," as they are now often contemptuously called, chiefly because so many stupid people are violating them and making the most of the notoriety obtained thereby, are all the products and creations of people of brains.

The Ten Commandments were not written by a moron.

The Ten Commandments were the product of the supremest intellectual vision and power of the one race of people which has probably possessed the loftiest moral genius of any race of people that has ever lived.

In one form or another, the moral code embodied in our Ten Commandments has existed in all races, even the lowest; and these moral codes have been the creations of the men and women of genius in every race.

WHAT IMMORALITY IS

The reason for this is simply that in every clime, in every period of history and in every community of people the leaders have found from experience that the good old-fashioned virtues paid.

Immorality is a foolish, short-sighted, stupid way which people take for getting something they want or think they want.

Morality and righteousness are simply intelligent ways of living. It is true that some persons of high ability take foolish ways for gaining what they want. But they do not use stupid means to gain their ends nearly as often as unintelligent people do.

Nothing could more clearly confirm this than the fact that about three-fourths of all our criminals and nearly four-fifths of all immoral women are feeble-minded or emotionally and temperamentally defective.

A FRUITLESS SEARCH

F. A. Woods told me just the other day that he had been searching throughout all history for twenty-five immoral, dissolute men of science of first rank and had failed to find them.

Just test yourself on this notion that geniuses are immoral and that the good old virtues are made mostly for simple, plain people who have not nerve and sense enough to violate them. If most geniuses are immoral, you ought to be able to name a large number of them off-hand.

I have had several hundreds of people try doing this, and I believe you would be no exception. You would say, "Why, yes, most geniuses are immoral or unbalanced in some way; just look at Edgar Allan Poe, Robert Burns, Oscar Wilde, Lord Byron, Aaron Burr and—and—well, I don't just off-hand think of the rest, but then we all know most of them have led immoral lives."

WHERE ARE THE OTHERS

But, where indeed are all the hosts of immoral, eccentric musicians, painters, writers, inventors, actors, statesmen, generals, philosophers, discoverers, mathematicians, biologists, psychologists, astron-

omers, historians, poets, educators, novelists, electrical wizards, chemists, physicists and financiers?

Since you insist that immorality and eccentricity of conduct are the usual characteristics of such persons, surely you can name several hundred who have been dope fiends, drunkards, and corrupters of good manners generally.

After thinking awhile, you might be able to recall among geniuses who have left unsavory moral reputations the following: Alexander the Great, Jenghiz Khan, Napoleon Bonaparte, Peter the Great, Catharine the Great, Shelley, the poet, Lord Nelson, the first Duke of Marlborough, Louis XIV and—and—well, where are the rest of them?

DRINKING AT ORDINATION

Surely there must be many more. If you have read much history in recent years, you may be able to remember having read that Cæsar and Immanuel Kant had epileptic fits, that Wagner was irritable, that Offenbach, the musician, was a bit too gay, and that Daniel Webster drank more than was good for him, as nearly all men did in his day.

Woodrow Wilson tells us in his *History of the American People* that in the early days when a minister was to be ordained, the deacons and leading church members drank enough to start a saloon. He says that they had to appoint one of the visiting ministers who agreed to keep sober enough to perform the ceremony, and that the women members of the church brewed the liquor!

But getting drunk was not then regarded as in the least immoral and was the universal custom. But this custom has been found to be unintelligent—that is, immoral—and nearly all intelligent people have long since abandoned it.

EDUCATION AND MORALITY

As intelligence and education grow, morality always improves.

It is true DeQuincey and Coleridge fell into bad drug habits. Stevenson and Chopin both had tuberculosis, but about one person in ten dies of tuberculosis, anyhow, whether he is a genius or not.

It is also true that Catharine de Medici, Lorenzo the Magnificent and Cesare Borgia were a tough lot. Benvenuto Cellini, the Italian painter; Boccaccio, the writer; and Horace, the Roman poet, were pretty wild blades, but most of us have to look into a cyclopedia to find these facts.

But test yourself and see how many famous men and women you can recall *without a cyclopædia* whose noble lives and characters gleam from every page of human history.

A LIST OF THE ILLUSTRIOUS

Without the slightest effort I think of Moses, Isaiah, Shakespeare, Lincoln, Washington, Hamilton, Jefferson, John Randolph, John Marshall, Roosevelt, Florence Nightingale, Joan of Arc, Charlotte Cushman, Mary Lyons, Harriet Beecher Stowe, Sarah Siddons, Plato, Aristotle, Socrates, Pericles, Cicero, Seneca, Marcus Aurelius, St. Augustine, Thomas Aquinas, Martin Luther, Thomas More, Sir Walter Scott, Dickens, Thackeray, George Eliot, Faraday, Pasteur, Helmholtz, Bach, Mozart, Beethoven, Liszt, Edward MacDowell, Cæsar Franck, John Milton, Dante, William the Silent, Gustavus Adolphus, Alexander the Second of Russia, Hegel, Spinoza, Herbert Spencer, Huxley, John Tyndall, Charles Darwin, Alexander Graham Bell, Robert Fulton, Louis Agassiz.

This is only a sample which anybody can think of

in three minutes. With a little thought, any well-informed person could easily add five times as many.

AN ALL-INCLUDING STIGMA

Of course we hear a great deal about the frightful immorality of actors and musicians and other public artists. We must remember that *all* these persons are at *all* times in the limelight. Their very professions require this. Consequently, when one of them is guilty of some moral dereliction, the whole world hears about it.

Indeed, this is true of nearly all men of genius. From the nature of the case, they are prominent persons, and if one out of hundreds lives an immoral life, it throws a stigma over them all.

The fact that a vast majority of musicians, writers, actors, and the like live quiet, modest, wholesome lives and are just like any other class of good people, does not make food for gossip.

If you live next door to John Smith, the famous actor, and his cook told your cook that Sunday night Mr. Smith brought home a box of candy for his children and flowers for his wife, and spent the evening with them by the fireside, would you, on hearing this, rush to the telephone and tell the world?

MORALS OF THE AVERAGE MAN

No, indeed; but what if you were told that John Smith took flowers and candy to *another man's* wife, and on arriving home had beaten his own wife and children? If one out of hundreds of actors, writers or corporation presidents violates the moral standards, we talk of the incident with uncounterfeited glee.

And if we study not merely the lofty geniuses of the human race but the average man, we find that almost universally the abler people are, the more

moral they are. Any factory superintendent knows that skilled workmen—that is, intelligent workmen—are far more moral, steadier, more dependable than unskilled laborers.

As an example, the Brotherhood of Locomotive Engineers has had a magnificent history for keeping contracts—the very acme of sound morals. In every community everywhere they belong among the moral, upright, dependable citizens. The same is true of any skilled trade or craft. The higher up we go in skill—that is, in intelligence—the higher up we go in sound morals and good citizenship.

A PROMISE FULFILLED

Among the leading scientists of the world there are not half a dozen who have the slightest reputation for any form of departure from sound morals. My own studies indicate that research scientists have probably the highest average virtue of any group of similar numbers in the world's history. And, perforce, they have to be men of talent and, in most cases, genius.

But the crowning proof that virtue pays is the proof by F. A. Woods, in his study of the royal families, that the Fourth Commandment is a great biological document. It is the first commandment with a promise—the promise that those who obey their parents—that is, live righteously and virtuously—shall live long in the land which the Lord God has given them.

Woods proved that the good live long and the bad die young.

THE FOOL AND HIS FOLLY

Verily the fool *does* perish from his own folly, whether prince or pauper, king or peasant.

Stupidity and immorality on the one hand, and intelligence and virtue on the other, are linked in the very biological make-up of the human race. The exceptions to this only prove the rule.

Not only do the good, old-fashioned virtues pay, but it pays enormously to educate people in their practice.

And in the conduct of national life moral character outweighs everything else. All through history, when the old-fashioned virtues really became old-fashioned and were held in contempt, it has been because stupid men, men of less intelligence and therefore of lower character, had gained control of the national life. When that happens in any nation, it is the proof of national decay.

In addition to the important evidence already cited, Dr. Catharine M. Cox, of Stanford University, has recently published her fine study entitled *Early Mental Traits of Three Hundred Geniuses*. This contains a critical examination of the mental and moral characteristics of a most remarkable group of youngsters. As Doctor Cox proves, her "boys" as she calls them, were conspicuously above the average not only in mental ability but in moral character and conduct.

Doctor Cox made exact ratings of these three hundred geniuses in sixty-seven different moral traits. These traits were partly worked out by Webb, an eminent English psychologist, and in part represent Doctor Cox's own work. They are the traits which are considered, according to Webb, as "desirable traits in present-day school boys and girls." They include such traits as physical bravery, sense of humor, constancy in friendship, family affection, gentlemanliness, fondness for social gatherings, trustworthiness, conscientiousness, absence of offensive self-esteem, desire to excel, constancy of mood, strength of character, and the like. She divided these

celebrated geniuses into eleven separate groups, namely, artists, writers (including poets, novelists, dramatists), musicians, writers (including essayists, historians, critics, scholars), soldiers (including soldier-statesmen), soldiers (fighters), scientists, philosophers, revolutionary statesmen, religious leaders, statesmen (political).

In all these sixty-seven traits, Doctor Cox, by elaborate methods, compared these ten groups of geniuses when they were children with the ratings of average, unselected school children upon the same traits. *Every group of geniuses ranked in moral character above average school children of to-day.* I could elaborate extensively these findings; they set at rest forever the notion of the immoralities and eccentricities of men and women of genius. The simple fact is that the popular impressions upon this important matter, like all other popular impressions, are based upon observation of the exceptions, and are, therefore, not true.

INTELLIGENT PEOPLE LIVE LONGER

In addition to the correlation of the mental and moral characters of man, which I have purposely argued at some length because of its enormous importance to eugenics, a great many other associations among human traits have been worked out in the past few years. Every good trait or character in human beings that has been studied has been found to be associated in a safe degree with general excellence of body and mind, with the single exception of the special characteristics previously mentioned that were studied by Doctor Kelley. For example, Professor Terman found in studying a group of nearly one thousand extraordinarily gifted children in California

that they came from longer-lived stock than the average. They were also bigger and healthier and had greater lung capacity than average children, and they weighed nearly three-quarters of a pound more at birth. As another example, Dr. Leta Hollingworth and Miss Margaret V. Cobb selected fifty-seven remarkably precocious children in the grades of the New York City public schools. Miss Grace Allen, of the Eugenics Record Office, traced the families of these brilliant youngsters. She found as she went back among their parents and grandparents that at the age of seventy years five times as many of them were living now, or were living in their day, as is found in the general population. Only ten per cent. of the babies born into the world are still living at the age of seventy; but Miss Allen found that fifty per cent. of the ancestors of these precocious children were living at the age of seventy. Doctor Cattell, the psychologist, studied one thousand of the most eminent men that ever lived, and found that fifty per cent. of them were living at the age of seventy; that is, five times the expected number.

GENIUSES HAVE GOOD HEALTH

All this indicates that goodness and virtue and every other thing of good report tend to go together in the mental and physical constitution of human beings. The shallow criticism made of eugenics, that geniuses have mostly been frail, neurotic weaklings, is the precise opposite of the facts. Dr. J. F. Rogers of the United States Bureau of Education, in *The Scientific Monthly,* has given a smashing answer to this criticism of eugenics, by submitting an extensive array of facts with reference to the health of men of genius. The article is entitled *Genius and Health,*

and from it I paraphrase the following passages, chiefly in the author's own words.

Emerson declared, "Genius consists in health, in plenipotence of that top of condition which allows of not only exercise but frolic of fancy." Only the healthy frolic either bodily or mentally. Bernard Shaw says that a genius is a person who sees deeper than other people and "has energy enough to give effect to this extra vision." There need to be specific talents for genius, but there must be energy behind these, and it must be energy of a very real, bread-and-butter origin. The great man has usually looked the part. Lowell said of Emerson, "there was a majesty about him beyond all men I have ever known." Washington was preëminent for his physical prowess. Goethe was likened in his youth to an Apollo. Tennyson was "one of the finest looking men in the world." Wordsworth was "of very fine, heroic proportions." "Byron was as beautiful as his verse." "Leonardo da Vinci had a figure of beautiful proportions." Walter Scott was eminently handsome, and "cast in the mold of young Hercules."

Beethoven had broad shoulders and was firmly built, and said to have in him "concentrated the pluck of twenty battalions." Brahms was "the very impersonation of energy." Balzac's "whole being breathed intense vitality." Napoleon at the age of forty is described as "a remarkably strong and well-built man, who could work for eighteen hours at a stretch." No eight-hour day for him. Few geniuses have limited themselves to such a small pittance of work as eight hours a day. Some of their reputed ill-health has been due to the fact of their enormous energy, which drove their bodies beyond their strength and brought on temporary breakdowns.

Macaulay was "sturdy," Chalmers was "brawny,"

Victor Hugo was "strongly built," with a complexion like that of "a ripe winter apple." Michelangelo was "very muscular," and at eighty-six was a tremendous worker. Rubens was a fine horseman at fifty-seven. Titian was still painting with great energy when at the age of about one hundred he was stricken by the plague. His end "came as a surprise to his friends." Men whose death at the age of one hundred surprise their friends can hardly be termed weaklings, as the critics of eugenics try to make out is the case with most men of genius.

Browning looked "a monument of sturdy health." Richard Porson, the famous Greek scholar, "often walked fifty-two miles to attend his club in the evening." Alexander von Humboldt at sixty "climbed high mountains without showing fatigue." Benjamin Franklin at the age of forty often swam two hours at a stretch, and in his old age was fond of displaying his great strength. Dr. Samuel Johnson was held up by four footpads and held them at bay until the police arrived. Dean Swift, whom critics of eugenics hold up as one of their examples of a weakling genius, was fond of walking and boating but preferred riding, thinking it better for his liver and brain. Keats, who is one of the prize examples that the critics of eugenics are fond of citing, "was very robust until after twenty-two; he was short but broad-shouldered and was the best fighter in his school." He later developed tuberculosis, which Pearl has shown is by no means always associated with physical weakness, but even after that he had such great physical energy that he would often tramp for thirty miles in sun or rain in hopes of overcoming the malady. Yet Keats is one of the classic examples used by the critics of eugenics to illustrate their picture of the pale, frail, anæmic genius.

Charles Lamb is another pet genius of the critics of eugenics, yet he was described as being "as wiry as an Arab," and "could walk all day." Carlyle is another example of the sickly genius commonly noted. True, he did have a bad stomach, yet, at the age of eighty-two, he still walked five miles a day. How many men at that age are even living, let alone taking five mile jaunts daily! Tolstoi was an expert swimmer at sixty-five, and learned to ride a bicycle at sixty-six! At the age of fifty-eight he walked one hundred and thirty miles in three days, starting out with three young men, two of whom broke down on the way. Tolstoi reached the end of his journey in a merry mood and declared he had never enjoyed anything so much in his life.

John Wesley is another favorite example which eugenical critics delight to cite in their frantic efforts to prove that if the human race should become more intelligent it would become a race of sickly and anæmic neurotics. Yet of him Doctor Rogers says, "While of slight physique, he was an expert swimmer, and his journal has been called 'the most amazing record of human exertion ever penned.' Eight thousand miles was his annual record for travel on foot and on horseback for many a long year, and 'he spoke oftener and to more people than any man who ever lived.' "

Another genius whom the critics of eugenics cling to with great tenacity, as one of their prime cases of frail genius, is Coleridge. Yet Doctor Rogers says of him, "On one day of the year in which he wrote *The Ancient Mariner* he walked forty miles without apparent fatigue." The musician, Wagner, whom eugenical critics din into our ears as an example of a neurotic, unhealthy genius, was the best "tumbler and somersault-turner of the large Dresden

school; he was a daring mountain climber and when nearly seventy delighted to astonish his friends by standing on his head." Tchaikowsky is also often cited as an invalid genius, but Doctor Rogers says, "He read somewhere that, in order to keep in health, a man ought to walk for two hours a day and he followed this rule with as much conscientiousness and superstition as though some terrible catastrophe would follow should he return five minutes too soon."

Perhaps the prize example which eugenical critics hold up as the specter of a race of bloodless, feeble geniuses is Thomas DeQuincey. True, he injured his health by taking opium, a habit into which many a strong man has fallen almost entirely by chance. Yet Doctor Rogers says of him, that, even though deli cately made, he considered "fourteen miles a day as essential to his health, and at seventy he often walked seventeen miles a day."

BODY MEETS DEMANDS OF THE SPIRIT

After citing numerous other examples, Doctor Rogers concludes by saying: "The composite picture of *the great man,* obtained from this study of great men, is that of a being who made the most of his bodily possessions. Usually these were strikingly superior. Seemingly they unfolded apace to fit the aspirations of the spirit within. It was noted by Plato that it was not the good body that improves the soul so much as the good soul that improves the body. Not only does the great man, the truly great man, care, according to his knowledge, for his own body (which answers the charge of almost universal dissipation made against men of genius) but he is so keenly sensitive to any hampering by bodily imperfections or missteps that he has often felt called upon to preach

the gospel of health to others, and the sermons have been of the highest value. The exceptions to the picture which we have noted have been the lesser men. Because they were exceptions they fall outside the composite and if they blur it they also produce a shadow which intensifies the figure it surrounds."

The outstanding characteristic of all men of genius of all ages has been their abounding vitality and their dauntless determination to break through all limitations of the flesh and manifest in themselves the robust motto of the philosopher John Locke, which Doctor Rogers says still comes to every man of intellectual ability and energy like a trumpet call across the two centuries since it was uttered: "While we are alive let us live."

It is true from the very nature of the case that in men of genius the very energy of the spirit often outruns the energy and capacity of the flesh to meet its almost terrifying demands. We should remember that while the minds of men of genius tower above those of ordinary men like mountains above mole hills, yet their bodily endowments are not as a rule in the same gigantesque proportions. Professor Terman found that the one thousand gifted children whom he investigated were *measurably* superior to average children in bodily health and development, but almost *immeasurably* superior in their intellectual endowments. For these reasons, men of superlative genius, even though equipped by nature with greater physical capacity than ordinary men, by their very mental energy often break down the most superb piece of bodily machinery with which nature has ever equipped mankind. Another point to be noted is that in past times some men of genius have suffered all their lives from some harrowing illness or handicap which medical science can nowadays easily remedy in

childhood in a few minutes. Diseased tonsils, adenoids, teeth, and the like, have doubtless in past times impaired the health of many a great man, and, indeed, have killed many a potential genius in childhood.

But when we sum it all up, the contention of the critics of eugenics that we are likely to people the earth with a race of either highly intellectual bandits; or a race of poetic, musical, artistic, tubercular drunkards; or a race of epileptic, insane, dyspeptic philosophers; or a race of frail, delicate, emaciated, fragile and sickly writers, thinkers, inventors, mathematicians and scientists, has not a shadow of proof to support it. The public mind, which is always uncritical, is full of false traditions and superstitions about great men. For example, the awkwardness and ugliness of Abraham Lincoln are one of our national traditions. Ninety-nine Americans out of a hundred, probably nine hundred and ninety-nine out of every thousand, actually seem to believe that Abraham Lincoln was awkward, ungainly, disproportioned, loose-jointed, and exceedingly homely and forbidding both in face and figure. It happens that I have spent much time in a study of Lincoln's physiognomy and physique and have published an essay entitled, *The Beauty of Lincoln.* In this study, I believe, I have proved that, judged by every sound standard of true æsthetics, Lincoln was one of the most beautiful men that ever lived.

BEAUTY AND BRAINS GO TOGETHER

If it be true, as I believe our evidence proves, that intelligence is associated in human beings more commonly than otherwise with health, long life and sanity, it follows as a mere matter of course that it is likewise associated with beauty. This was true in the

case of Lincoln. His extraordinary personal beauty was the very outcome of his vitality and intelligence. In addition to the foregoing evidence from the work of Doctor Rogers as to the splendid health of men of genius, the British essayist and philosopher, Havelock Ellis, studied the lives of one thousand and thirty of the most eminent men and women in the history of Great Britain and made special note of this feature of genius. Ellis found the biographies of great men filled with references to the handsome appearance and physical beauty of these distinguished persons. Most great men have not only *looked* the part, but they have *been* the part, in every physical, mental and spiritual sense, which they have played upon the world stage. The association between beauty and brains is so opposed to popular belief that I venture to pursue the point a moment further. If the improved race which eugenics hopes to produce is going to be unattractive to look at, or, as some of our critics maintain, is going to be positively repulsive, then we are joy-killers indeed. Human beauty is the apotheosis of all beauty. If we are going to remove it from the world, the game seems hardly worth the candle.

The exact degree of association between beauty and brains needs far more extended investigation than has been given us. Prof. Knight Dunlop, psychologist, of Johns Hopkins University, has made some study of it in his little book entitled *Personal Beauty and Race Betterment.* He sees clearly, as I think no other psychologist has seen, the very great importance of the problem. As he says, "the conservation of personal beauty is *the* question of the hour." I myself think that next to the conservation of intelligence and its improvement, the conservation and the improvement of the beauty of the human form and face divine is not exceeded in importance by any other question.

A beautiful human race is bound to be a healthy, happy and intelligent human race, and none other will be.

On this point Mrs. Wiggam and I have made some rough investigations. I found by chance in the apartment of my friend, Doctor Woods, a large pasteboard box containing five or six hundred portraits of women which he had casually selected at random from newspapers and magazines for the purpose of studying some question in which he was interested. At his suggestion, I selected from this collection all of the women whose pictures had been published because of some intellectual achievement. This gave me a group of some sixty intellectual women. After turning the pictures face downward, we selected twenty of the pictures at random. Mrs. Wiggam then selected from the magazine *Vanity Fair,* entirely at random, the portraits of ten women, from a page of portraits which the magazine usually publishes every month, entitled *The Hall of Fame.* These women were all writers, authors, artists, or actresses, of great distinction.

We then selected from Fernald's book, *English Synonyms and Antonymns,* twelve adjectives and phrases referring to beauty or its opposite. The adjectives for beauty in their order were: Beautiful, handsome, charming, pretty, good-looking, attractive. To describe the opposite of beauty we listed, in their order: Unattractive, unpleasant, homely, uncouth, ugly and repulsive. The common objection is made that there are no standards of beauty by which to judge; but this set of adjectives gave at least twelve choices to every individual.

We then submitted these pictures, without any names attached, to some twenty-five persons of education and wide experience in the observation of human beings. Nearly all of them were professional platform

artists with enormous experience in judging people. They all ranked these women in order of good or bad looks.

We have not yet finished this investigation, simply because we have not been able to find any satisfactory method of arriving at the measurement of the beauty of the *average* woman. Beyond question, it can be arrived at, but several methods have proved unsatisfactory. We first tried obtaining votes on pictures taken at random from the newspapers, but this gives a much higher beauty than the average. We found, for one thing, that it includes too high a percentage of women who are seeking divorces, women engaged in breach-of-promise suits, and women who have been murdered. All of these are much above the average in beauty. For example, a woman who gets murdered is usually a prize being sought for by at least two men, and her very beauty is her undoing. To arrive at the beauty of the average woman is, therefore, an extremely difficult, but an extremely important undertaking. I tried visiting photographers in small cities and selecting at random from their collections, especially family groups and the like. But this proved unsatisfactory, because there are all sorts of factors which complicate the problem, such as age, the amount and kind of work a woman has undergone, the amount of worry she has gone through, the amount of assistance she has had from beauty shops, and the kind of life she has lived, in a general way. Consequently, all that we have aimed to arrive at has been an approximation with probability in its favor.

AVERAGE WOMAN NOT BEAUTIFUL

However, even with these disadvantages, the estimates which we have taken, on the group of thirty

portraits of intellectual women mentioned above, easily show that the average range of their estimated beauty is far above the line of demarcation which separates them from the unbeautiful. There can be no question that their beauty is far above that of women in general, which latter is, I am convinced, very low. The average woman is not beautiful, and the average woman is not intellectual. The latter goes, of course, without saying. The same is of course true of men. The average is of necessity never in the higher ranks of any group of phenomena. (Therefore it is no particular disparagement of average people to point out that they *are* average and not extraordinary.)

Mrs. Wiggam and I have made a number of other investigations, but these indicate to us the trend of what appears to us to be the truth; namely, that good looks of both men and women are to a high degree associated with brains. The public mind is confused by the fact that, when judging beauty, especially a woman's beauty, most people are mentally comparing her with the most beautiful women whom they know, or else with some famous beauty, such as Agnes Sorel, or Ethel Barrymore or some of our famous screen beauties. But this is a wholly unfair and unscientific procedure. When we speak of a woman being intelligent or unintelligent, we are not comparing her with Madame Curie or some celebrated genius. We are comparing her with women probably somewhat above the average of intelligence but not very far above it. The aim of the student of human beauty is comparison with the beauty of the average. A celebrated beauty is a rare triumph of nature just as is a genius, and we do not compare common humanity with geniuses. We cannot compare geniuses with anybody. We compare them only with infinities and eternities. Just so

with the Apollos and Venuses of the race. They are the products of nature working in her freest and most joyous moods.

BEAUTIFUL WOMEN OF HISTORY

However, we made another rough estimate of the factors in this complex problem. We took a list compiled in 1903 by Dr. J. McKeen Cattell, editor of the *Scientific Monthly,* comprising one thousand of the most eminent persons that ever lived. Miss Cora Castle, of Columbia University, has also compiled a list, of eight hundred and sixty-eight of the most eminent women of all history. (Incidentally, Miss Castle tried to find a thousand distinguished women in the history of the world, but was unable to find so many. One of the profoundest problems of psychology is whether this failure of women to make distinguished achievements is due to lack of ability, or lack of temperamental drive and interest, or lack of time and energy, because of their duties in rearing children and taking care of the men; or whether it is due to lack of general opportunity and stimulus in the environment. There can be little doubt that the latter two factors have been important items in the problem.)

Miss Castle selected by objective methods twenty women whom she designated as a preëminent group. Doctor Cattell included thirty-two women in his list of the greatest persons of history. We find by comparison that there are fifteen women whose names are included in both the Cattell and Castle groups. It seems safe to assume that these are at least the most famous women that humanity has produced. At any rate, there has been more written about them and they have made a greater stir in history than any other women. We know that most of them were women of

preëminent mental ability. Their names are as follows:

Mary Stuart, Queen of Scots
Queen Elizabeth of England
Joan of Arc
Madame de Staël, French writer
George Sand, French writer
Catherine II of Russia
Madame de Sévigné, French letter writer
Madame de Maintenon, consort of Louis XIV of France
Maria Theresa, Queen of Hungary and Bohemia
Josephine, wife of Napoleon
Marie Antoinette, wife of Louis XVI of France
Christina of Sweden
Cleopatra, Queen of Egypt
Catherine de Medici, Queen of Henry II of France
Queen Anne of England

After a good deal of searching, we secured what seemed to be a fairly good printed portrait of each one of these women. Of course, one has to allow for the flatteries of court painters, and the like. It is likely that if a portrait painter had not flattered Catherine de Medici he would have had his head chopped off. However, these portraits probably bear a considerable approximation to the anatomy and appearance of these famous persons. We submitted these portraits to a number of cultivated persons with the same list of adjectives to choose from which we used in the case of the other group previously described. The combined vote showed that nine of these women were ranked in the upper five categories of beauty; namely, beautiful, handsome, charming, pretty or good-looking. Only one, Madame de Staël, was voted as positively ugly. This was doubtless because

the portrait was one of her in advanced years. Some writers have described her as very homely in later life. But Emil Ludwig in his masterly life of Napoleon says: "She was handsome, but was too intelligent to please him," (Napoleon). As an evidence of her supreme intellect, Ludwig makes the interesting statement that Madame de Staël was the first person in the world to perceive the extraordinary genius of Napoleon Bonaparte.

STAGE BEAUTIES ARE NOT DUMB DORAS

Through the courtesy of John O'Hara Cosgrave, long-time editor of the *Sunday Magazine of the New York World,* I have just been furnished with the figures of an investigation made at his instance by Dr. David Weschsler, psychologist of the New York Psychological Corporation upon the brains of the supposedly dumb chorus girls. Doctor Weschsler gave the army mental tests to a large number of stage beauties, most of them singers and dancers. The results were astonishing and showed that these chorus girls who are among America's most beautiful women averaged higher than male college students. The average score on these tests of the army draftees was 61. The average of actors generally is 75, of business men 86, of college women 130 and of college men 127.

THESE GIRLS TAKEN AT RANDOM AVERAGE 128!

A few scores ranked in the ranges of genius. For example, Marion Gillon, of *Countess Maritza,* scored 159, Dorothy Wegman, a Ziegfeld beauty, scored 166, Georgette Moore of *Great Temptations,* made 167, Kay English, another Ziegfeld beauty ranked 168, while Miss Edith Davis, of *Naughty Riquette,* made the astounding score of 184—probably above the average

college professor. This score is reached by not more than one person out of one hundred and twenty-five of the general population. The "silly chorus girl, whose only asset is her beauty" seems to have the very great asset of high intelligence as well.

BEAUTY AND RACE BETTERMENT

There would seem, therefore, to be pretty strong evidence that if we can raise the level of human intelligence we shall improve the good looks of the race; or, vice versa, if we can raise the level of beauty we shall improve the intelligence and moral nature of man. Mrs. Wiggam and I have made some further general observations upon the beauty of women's feet as correlated with intelligence and moral character. Our purpose was to overcome the very just objection that the beauty of a woman's face is very much a matter of environment, diet, and a healthy, happy and easy life. But this can hardly apply to women's feet; at least, to the extent that it applies to their faces. The shape of a woman's foot is pretty well determined by nature. A high, beautifully molded, aristocratic instep can hardly be produced by a shoemaker, and a low, flat, clumsy foot can hardly be squeezed into an A, AA or AAA last. Our only observation on this point is that we find that a number of shoe stores located on upper Fifth Avenue and other exclusive social sections of New York City, carry scarcely any women's shoes broader than B; and sixty per cent. or seventy per cent. of their stock runs in the A last.

Of course, it is a pretty broad inference, and yet one that is probably not fantastic, to suppose that the intelligence which is very high in this exclusive social region is correlated with well-shaped and, to some extent, with small feet. And since the

human figure is a logical development, beautiful feet indicate a sound anatomical make-up which is the basis of beauty. Considerable observation of the young women in our private schools and colleges gives me the impression that the coming generation of athletic women will develop broader and stronger feet than are indicated by these extremely narrow lasts. I see very few feet on the gymnasium floors which I believe could be healthfully squeezed into these extraordinarily narrow lasts that are at present fashionable. But this will only give the student of such a problem a better opportunity to find whether there is any real correlation existing between such factors in the anatomy and the higher and more recently evolved brain centers concerned with intelligence. I doubt that it is straining a point very greatly to imagine that if men selected their wives for their beautiful feet alone, taking into account both shapeliness and strength, the race would improve in intelligence and moral character.

Of course, the reader will, I hope, keep constantly in mind that I am speaking only of general average tendencies. Just because they are only *average* tendencies, they *must of necessity* have a large number of exceptions. On this point of beauty, for example, one of the noblest and most remarkable women I ever knew was almost a giantess in physical make-up. She had vast, ungainly shoulders, arms and hands, and was known for miles around for her enormous feet. Yet she raised eleven sons, on a miserably poor sixty-acre tract of land. Six of her sons became distinguished, and five became very successful business men. They were all men of exceptionally handsome appearance, of great vitality and of high character. One of them became one of the leading college presidents of his time. Consequently, the reader must remember that exceptions, such as this truly wonderful woman, only

prove the rule, that brains and beauty are associated more often than otherwise.

I hardly believe that my reasoning, however, is purely fanciful, as Haldane, that interesting biological prophet of Cambridge, presented some strong arguments on this point in the original manuscript of *Dædalus,* which I was privileged to read before the more select portions of it were published in the *Century Magazine.* Haldane presented some strong theoretical considerations, which indicated to him that the human face, neck, shoulders and breast—indeed, the whole upper part of the body, especially in women—improved wonderfully in beauty after human beings rose to an upright position. Thus, for the first time, men and women could take a good look at each other, and, to put it in common parlance, "size each other up." Beyond question, these selective factors have worked through human history; it is absurd, with our modern education in art and anatomy, to suppose that they are not working now. I think it is not going beyond present-day evidence to believe that there are powerful evolutionary forces at work to correlate with human intelligence that economy and logic of development which is the basis of beauty. And we have already seen that intelligence is associated with long life, sound health and moral character.

The upshot of it all is that there is not the slightest need for alarm on the part of our critics lest eugenics, should it succeed in improving the human intelligence, would people the world with a race of short-lived, ugly, physical and moral weaklings. If eugenics, by holding up lofty ideals of beauty, can improve the race in beauty alone, it seems safe to assume it will at the same time improve it in all other desirable ways. Or, if it can improve it in intelligence, it will have the same effect. Or, again, if it can improve the race in its

natural, inborn health—as I rather believe the lofty ideals of health which this age is preaching are already beginning to do—not by direct inheritance of the acquired good health, but by causing young men and women to select healthier mates in marriage, then it seems a reasonable conclusion that the race will also improve in intellectual ability, social capacity, artistic power, length of life, and everything that men live for and desire. Eugenics then is in direct line with all progressive social as well as organic evolution and is not against them.

FOURTH CORNER STONE OF EUGENICS

The fourth corner stone of eugenics is *the tendency of like to marry like.* This is a principle which runs through both the animal and the human kingdom. The principle is called by statisticians "assortative mating," and was discovered,—or, at least, described,—by Sir Francis Galton, who also invented methods for measuring it.

There are two statements which we often hear bearing upon this point with reference to marriage; first, "Marriages are made in heaven," and second, "Marriage is a lottery." I have no statistical or experimental means at hand for disproving the former. However, down at Woods Hole, Massachusetts, one of nature's beauty spots, where many young men and women assemble every summer to study biology under our most distinguished leaders in this science, a large number of marriages takes place. As Professor Conklin of Princeton, the wit of the biological profession, recently remarked, "If marriages are made in heaven, Woods Hole is a branch office." Statistics have shown that there are a great many of these branch offices of the supposed celestial matrimonial bureau, especially

at our schools, co-educational colleges, summer resorts, and the like; and it is found that at these marital centers, as everywhere else where men and women have extensive contacts, that like tends to take up with like.

If it be true, on the other hand, that marriage is a lottery, this would be the same as men choosing their wives by lot or throwing dice to determine their matrimonial choices. In fact, there would be no choice about it, and the result would be purely random selection. In that case, a man's wife would resemble her husband no more than she would resemble some other man. Professor Pearson, of London, has done more work on this problem than any other statistician. For example, suppose the average height of the men in a community were five feet eight inches and the average height of the women five feet six inches. Professor Pearson finds that in such case the men who were six feet tall—that is, varied from the average by four inches—would more often than not have wives five feet seven and one-eighth inches in height. So, if a man varies from the average in the matter of stature, his wife, as a rule, will be found to vary just a little more than one-fourth of this amount. It has been found that this tendency of like to marry like holds good in even such traits as eye color, hair color, general health, intelligence, insanity, tuberculosis, and a number of other traits which have been studied.

This principle is, of course, quite contrary to popular belief. But popular notions are always wrong. This does not apply to notions of art and religion, because in these fields taste and emotion are our chief guides. But popular notions about matters of fact and natural law, if they have never been tested and corrected by science, are always wrong. They almost *have* to be wrong. It is well-nigh a psychological necessity that they should be wrong. This is because

people in general observe only the exceptions to the rule, and they make a guess as to the cause of the exception.

LIKE MARRIES LIKE

I shall in a moment cite a number of other instances of wrong popular notions; but one is the belief that opposites tend to marry each other.

For example, when people see a tall man walking along the street with a short wife they usually exclaim, "The long and short of it! We have always noticed that opposites marry each other!" If they had the mental agility and interest, and would observe closely the next twenty-five married couples that come along the street together, they would be amazed to discover the number of couples who look very much alike. If they will observe several hundred they will discover among them quite a number of couples who resemble each other more closely than brothers and sisters ordinarily do. Fat people tend to marry fat people, the leans to marry the leans, and the talls to marry the talls.

It is in this way that nature preserves her types and species. If living things did not mate after their own kind, evolution, to use common parlance, would soon be "shot to pieces." If, for example, nature, by using all her forces of variation, adaptation, selection and heredity, should succeed in building up a character in an organism, and then should make it repulsive to the opposite sex, plainly, it would soon disappear. Suppose musical talent arose suddenly in the human race in some one individual by some enormous mutation. The other individuals in the race not having musical sensibility would, of course, be unaware at first of the presence of this new character. It would

at first be distributed among a few of this individual's descendants, by mere chance. But suppose that among those individuals who possessed it the tendency to make musical noises proved annoying and distasteful to the opposite sex. It seems evident that the talent and taste for music would by this process soon become so attenuated that it would vanish. This is a very crude, and, in some ways, an illogical example; but in a general way, it describes evolutionary tendencies toward assortative mating.

As further examples of how universal this principle is and how it operates, Professor Pearson and his associate, Dr. Charles Goring, found that as we come up in the social and economic scale from the very poor to the very prosperous this resemblance of married persons to each other tends to become more striking. Doctor Goring found, for instance, that the tendency for a drunkard to marry a drunkard is considerably greater among the well-to-do than it is among the very poor and destitute. On the other hand, Professor Pearson found that among the well-to-do and professional classes a man with a marked tendency to tuberculosis is more than twenty times as likely to marry a woman with a tendency to tuberculosis than is true among the very poor and destitute. He is nearly twice as likely to do this as is a man from the prosperous laboring classes. Professor Pearson thinks this is because among the very poor classes men and women do not have much choice. A man marries a woman in the next house, or the woman who works by his side, and the like. Such a man cannot attend schools and colleges and travel about and go to summer resorts, as a man of the professional and more favored classes can do. The poor man merely marries the woman whom he happens to meet in the day's work; but the more favored man has a much wider

range of choice, as has also the woman. As a consequence, like tends to find its like where it has range and opportunity.

Dr. Charles B. Davenport, of the Carnegie Institution, believes from his investigations that this tendency does not work between persons endowed by nature with high tempers. This is probably because they fall out and disagree before they ever reach the marriage altar. If this be true, one can hardly regard this as either a social or a biological misfortune.

POPULAR NOTIONS ALWAYS WRONG

I cite these examples both to prove the case that like marries like and to show how popular impressions arise and how little they can be trusted to lead us to the truth. One could easily cite numerous other examples in other fields of natural fact. It has always been believed, for instance, that bald-headedness is due to tight hat bands; that handling toads will cause warts; that bullies are always cowards; that night air is dangerous to health; that there are such things as equinoctial storms; that educating parents will cause their children to be born brighter; that mothers can birthmark their children by prenatal impressions; that mothers can increase the musical ability of their children by singing or playing musical instruments before they are born; that persons of high ability go insane and are neurotic more often than morons and feeble-minded persons; that nearly all geniuses are immoral; that drowning persons have water on their lungs; and that you can't reason with a woman. A little examination reveals the fact that these are either exceptions to the rule of nature or else are precisely the opposite of the truth.

If you should wish to test this principle by crude approximation, you might try with some friend an

entertaining experiment which Mrs. Wiggam and I have sometimes indulged in when traveling on the train. When we saw an unusually fleshy woman coming into the car, Mrs. Wiggam would wager that the woman would in a moment be followed by an equally fat husband, or that a tall woman would be followed by a tall husband, and the like. I have been forced, however, to discontinue this domestic diversion because Mrs. Wiggam won all the money. If people generally would only try to observe, even in such crude ways as this, the actual facts of life and nature right about them, it would go a long way towards developing that respect for scientific truths which would enable the scientific statesman to apply exact principles to the problems of social development. Assortative mating is almost universally disbelieved in, and the notion that opposites marry each other is almost universally held as a fact. Yet a little exact study has revealed that husbands and wives resemble each other as closely as first cousins or as nieces and nephews resemble their aunts and uncles. Almost everyone admits the fact of family resemblances, but assortative mating is just as much of a fact, and it is by this method that, to some extent, family resemblances are preserved. It is through the fact of assortative mating that social classes are built up, since a man tends very strongly to marry in his own social class. In this way aristocracies have been built up, great and powerful families have been founded, and the whole destiny of the world has been profoundly affected.

ASSORTATIVE MATING THE SALVATION OF EUGENICS

It is because of assortative mating that those who plead for the equality of human beings, and hold that all social classes are contrary to nature and that the son of a pauper is just as good as a princess and should

be privileged to marry her, will never have their way. Nature herself is working against them. People will always tend to marry their like, and it follows that social classes are just as much ordained by nature as they are by the processes of our social and economic life. This affords not the slightest warrant, of course, for one class to exploit or oppress another, but is merely a statement of a fact of nature. Furthermore, the principle of assortative mating is the very salvation of eugenics. For, if the daughter of a deacon were as likely to marry a jail bird as she is to marry the son of another deacon, if college graduates made a specialty of picking out morons as marital companions, if gentlemen always preferred blondes irrespective of their intelligence, health, or moral character, then all hope of ever improving this race of ours would have to be abandoned.

Fortunately, however, nature is on the side of eugenics. If there were no forces of nature which man could lay his hands upon in order to forward his own biological fortunes, he would be in precisely the situation in which the purely mechanistic, Behavioristic theory places him; he would be a mere helpless piece of driftwood floating between two eternities down the stream of time. But I have become convinced that man can manipulate to a considerable extent the agencies that have made him what he is. He can thus insure to his descendants a progressively greater command over the forces of life and circumstance, a greater freedom from the bestial chastisement of brute natural selection. By his command over the forces of his own being he can thus bring through his descendants more intelligence and moral character on earth, and more good health as well as good will among men. The concluding section of the book will be devoted to an inquiry as to how these forces operate;

to what extent they may be controlled by intelligence; and, especially, whether they will not operate amid civilized conditions, even without any human interference and of their own weight and dynamics, so that they will work an improvement in human nature as the ages slowly and patiently unfold the future annals of mankind.

SECTION FOUR

ARE WE WINNING THE HUMAN RACE?

IV

AMONG THE IMMORTALS

THIRTY BILLION persons have been reared to maturity in civilized countries since the dawn of history some eight or ten thousand years ago. This is the estimate of the Eugenics Record Office of the Carnegie Institution. It was exhibited, together with a number of other unique facts of man's biological history on a large chart at the Second Eugenics Congress held in September, 1921, in New York City, and attracted much attention. The estimate was not meant to be exact and, therefore, a few millions, or even billions, more or less do not greatly matter. The thing of unique interest which the chart pointed out was, however, that only about five thousand persons out of the whole thirty billion ever amounted to much.

It is somewhat surprising that only about five thousand human beings out of the billions upon billions that have been born and strutted their little hour across the world's stage have ever risen high enough above the dead level of mediocrity so that we can look back and see their figures standing above the centuries. The chart was surely generous enough in making the number even as great as five thousand, as it included twenty-six varieties of human achievement. These achievements ranged from those of lawgivers such as Moses and Alfred the Great; examples of moral purpose such as Luther and Lincoln; poets such as Dante and Shakespeare; fiction writers such as Hugo and

Dickens; outstanding figures in business such as Cecil Rhodes and Rothschild, to examples of mere physical prowess such as Pheidippides, the Greek, and Sandow the modern. This indicates either that fame and the opportunity to make remarkable achievements are partly or wholly a matter of chance, and that a great many more men—indeed, as the environmentalists think, all men—could have made equally great accomplishments if they had had the chance; or else it indicates that only one person out of six millions has been endowed with those extraordinary characteristics of mind and body that have enabled him to bring to pass those extraordinary human performances which have lifted whole nations and eras and races forward upon the pathway of progress.

In addition to the five thousand supreme individuals, the above mentioned chart estimates there have been about one hundred and twenty-five thousand of lesser talents, but who have left sufficient achievements to enable us to tell who they were. There is a sort of grand pathos in the reflection that, notwithstanding the fact that the humblest human being expends a large part of his total earthly energy in trying to be important and influential in his day and time, we cannot now find even the name of more than a few thousands of all the countless throngs that have trod the human pathway. Only about one hundred and thirty thousand have left sufficient records of who they were or what they did, or what they adventured or what they thought about, to enable us to identify them as distinct personalities, as real actors in the great drama of time.

This group of one hundred and twenty-five thousand are in the main those men and women who have not exactly made progress but who have merely kept the world together and kept it going after some giant

genius started it. They might be designated as the "Who's Who" people of the world, somewhat above our present *Who's Who,* of course, but not those who rank among the discoverers, creators and prophets. They are designated by the Eugenics Record Office on the chart as having been "persons of special skill, intelligence, courage, unselfishness, enterprise or strength."

We can well ask the question, Are we really winning the human race? when, after searching the records of ten thousand years, we can identify only one hundred and twenty-five thousand who have exhibited "special skill, enterprise or strength." This would constitute only one person out of every quarter of a million. Certainly, we can scarcely pride ourselves that the human race has as yet won the immense stakes of health, intelligence and energy—the three basic sources from which all genius springs—if only about one person in each quarter of a million has possessed these qualities in a truly notable degree. As far as mere numbers are concerned, if these superior persons were taken out of the population it would require a microscope to find the dent which their absence would make in the vast mass of humanity.

Suppose we be generous and raise the number of these important persons from one in a quarter of a million to one in four thousand. This was the ratio by which Sir Francis Galton defined the word "eminent." This ratio is frequently used by statisticians nowadays. The entries in our present *Who's Who* run about one person in every four thousand in the American population. This would raise the number of talented persons throughout human history to six or seven millions. However, many persons in our present *Who's Who* have achieved only temporary notice by their fellows.

Their achievements are of small moment when we think of them as being distinct impulses in the long roll of the ages. But even if we consider that this number, say six millions, have been necessary to progress, yet if they had never lived, their absence, as far as their mere numbers are concerned, would scarcely be noted from the grand total. Yet the strength of mind and body, of soul and spirit, of these few precious people is worth more than all the rest of humanity put together. It would not be noticeable in the census report if the names of all our thirty Presidents were omitted. Yet it is beyond question that the spirit and energy of a few hundred persons such as these are the real forces which have transformed America from a wilderness to a world power and given it its place in the sun.

PROGRESS NOT CAUSED BY THE MASSES

I have recited these facts merely to emphasize once more the point that progress is not a product of the masses, but the creation of a few unusual individuals who have very little relationship biologically to the rest of the population. Anthropologists have worked out a good many elaborate theories as to how culture arises and how it is passed on. But it seems that the outcome of all their elaborate theories is bound to be that the elements of culture are created by the few and are used and passed on by the many.

It hardly seems necessary to dig up the ruins of buried civilizations and go back in imagination to some mysterious time of the world in order to find evidence that this notion of progress is probably correct. You and I, for example, did not invent the telephone. Nor was the telephone invented by the masses. The masses never invented anything. They can't invent

anything. Experience has proved that it is difficult enough to get a dozen highly trained men to coöperate in a laboratory on one research with a view of discovering or inventing something, let alone trying to get the masses to do this. The masses have no business trying to invent things. It is no disparagement of common people to say that their chief business, their chief hope of happiness, their chief protection for themselves, is to pick out those persons of talent and genius who can invent things for them, and through whom they can express their passions and their desires.

On this point, one of the leading educators of America, a profound believer in the education of the masses and in the power of education to elevate men and make them happy and effective, said to me recently, with great earnestness: "If I were forced to choose between education and selection, I would unhesitatingly choose selection." He meant by this that if he had to destroy all our system of education and give up all hope of lifting the masses above ignorance, as far as the things of culture are concerned, but still possessed the power to pick out leaders and set them over the people, he would far prefer to trust the intelligence and character of these leaders to create progress and take care of the masses than to trust any sort of education of the masses to enable them to invent culture and the means of happy and effective social progress.

The masses did not discover America, but their leaders did. The masses did not discover the mathematical formulas which have made modern physics and chemistry possible, but a genius unknown to the world in general, named Josiah Willard Gibbs, did discover and invent a large part of them. The masses of the American people do not even know that prob-

ably the greatest separate distinctive and penetrative mind which our whole history has produced was this one mind of Willard Gibbs. It is the few first-class, separate minds such as these that make possible such men of great but, nevertheless, lesser intellectual rank as Thomas A. Edison, Wilbur Wright, Marconi and Henry Ford. The masses do not even know who it is that creates progress, takes care of them, provides wealth, luxury and education for them, and keeps them out of the jungle. When they have in the past even suspected who their saviors and prophets were, they have usually stoned them or burned them at the stake, as ministers of the devil. Even now, perhaps America's chieftest danger is that its real leaders of thought and creators of sound and courageous opinion of life and the universe we live in are having these creations of the spirit, priceless to the masses themselves, torn from the children's school books. These leaders are, right here in so-called "free" America, denied, as perhaps in no previous period of the world's history, their natural right to guide and serve and lead.

Of course, a nation whose leaders have never invented any means of progress may now possess an enormous number of them. This in itself shows how the elements of culture are passed on from nation to nation and from age to age. For example, Mexico possesses books, newspapers, machine-made fabrics and tools, telephones, railroads and the like, but has never invented any of these things. They have been handed to them gratis by other peoples. True, Mexico has probably invented more elaborate and successful methods of misgovernment than any other people now extant, but it is hoped that her unique and unrivaled contributions of this nature to the human scene will not be extensively borrowed by other peoples.

FOUR QUESTIONS AT ISSUE

I have made these introductory remarks upon the relative number of leaders and their relationships to culture and progress because I wish in the remaining pages of this book to examine four questions: First, how the general population grows and how man has ever spread over the earth and how many people are ever likely to be on this planet; second, how leaders arrive and how they are related biologically to the remainder of the population; third, whether conscious efforts such as are embodied in the concept of eugenics present any hope of either improving the general population in quality or increasing the relative number of leaders; and, fourth, whether science has not placed agencies in the hands of man whereby, without any conscious effort or distinct program of race improvement, a new and rapid evolution may nevertheless set in which will sweep the race to higher levels of health, intelligence and character than it has ever reached before. In other words, my final inquiry will be whether civilization, notwithstanding all its apparently destructive character, is not evolving a naturally civilized man—a man more capable of creating and carrying on the values and meanings of culture than has yet appeared in the world. There is undoubtedly a rising tide of degeneracy; but I think there is along with it a rising tide of biological capacity which will be able to meet this temporary difficulty, and ultimately to secure for itself its rightful and happy possession of the world.

HOW THE EARTH IS REPLENISHED

When the human race was enjoined to multiply and replenish the earth, it may have been that the divine Lawgiver knew how his injunction was going to work

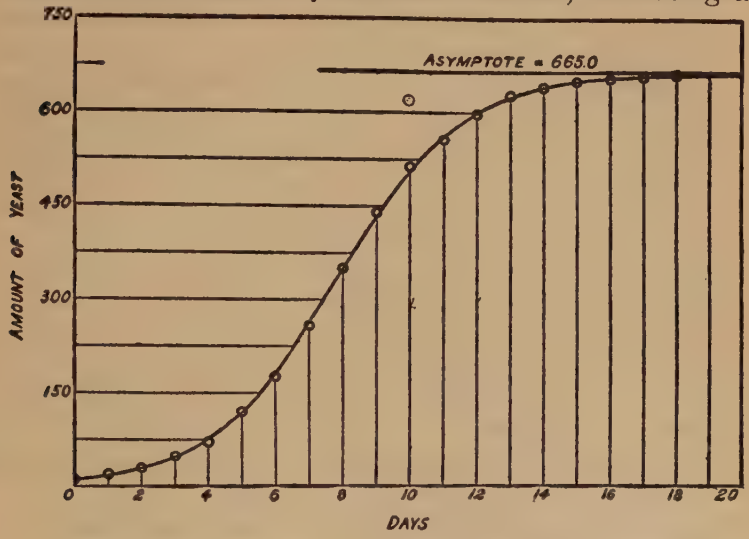
out; but, if so, we have no record of this fact. We are indebted very greatly to Raymond Pearl, whose work on alcohol has already been quoted, for some of the most penetrating explanations of the laws that govern the growth and expansion of peoples. The reader who wishes to understand this extremely important problem, one which is always interesting to the popular mind, should read Doctor Pearl's admirable book, *The Biology of Population Growth.*

Pearl first describes the experiments of a number of biologists, especially Donaldson, Robertson, Durbin, Carlson and others, who have shown how lower organisms multiply when they are confined within a given area, and where the element of time is taken into account.

"Suppose," says Pearl, "we consider what happens when a few yeast cells are dropped into an appropriate nutritive solution, saccharine in nature, and the whole kept at a moderately warm temperature. In such a satisfactory environment the initially sown cells quickly divide and redivide. Here plainly we are dealing with the growth of a population—of yeast cells to be sure, but still a population. We can, just as with human beings, take periodic census counts, or their methodological equivalent, and so determine the growth of the population. If such an experiment is tried the result will be essentially like that shown in the figure."

It will be seen that the population starts off rather slowly and later gains momentum, and then at the last slows down and runs off at the right almost on a level, indicating that the population has reached its limit and from now on the death rate and the birth rate will be almost equal. In short, the forces of expansion and retardation have come to an equilibrium. If one will examine the graph in detail, he will readily

see by running his eye along the bottom line and then along the vertical line at the left side, that during the first five and one-half days, approximately, the population rose to one hundred fifty. It now gains momentum from sheer numbers apparently, and by the tenth day has risen to the line half way between four hundred and fifty and six hundred, indicating a



Reprinted from *The Law of Population Growth,* by Raymond Pearl. Courtesy of Alfred A. Knopf, Inc., publisher, New York, 1926.

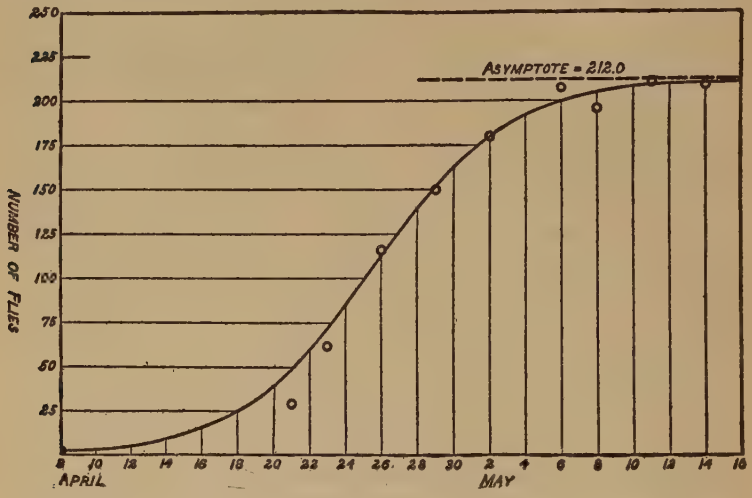
The growth of a population of yeast cells. Data from Carlson, represented as small circles. Smooth curve from equation.

The number of cells and the size of a tadpole's tail develop in the same way as the population of yeast cells shown here.

population of approximately five hundred and twenty five. Thus during this period of four and one-half days biological affairs have gone on gaily, and one might suppose that it would continue indefinitely. However, for some reason the rate of reproduction now begins to slow down, and by the eighteenth day birth and death have about balanced each other; from then on the population remains substantially stationary.

Pearl also shows that the body of the white rat as studied by Donaldson, and the tail of a tadpole as studied by Durbin, grow in the same way and follow the same logistic curve.

By ingenious experiments on the banana fly, Drosophila, the tiny insect we see flying about fruit, and also by extensive experiments on flocks of chick-



Reprinted from Pearl, *The Law of Population Growth.* Courtesy Alfred A. Knopf, Inc., publisher, New York, 1926.

Growth of wild type *Drosophila* population in half-pint bottles. The circles give the observed census counts and the smooth curve is the graph of equation.

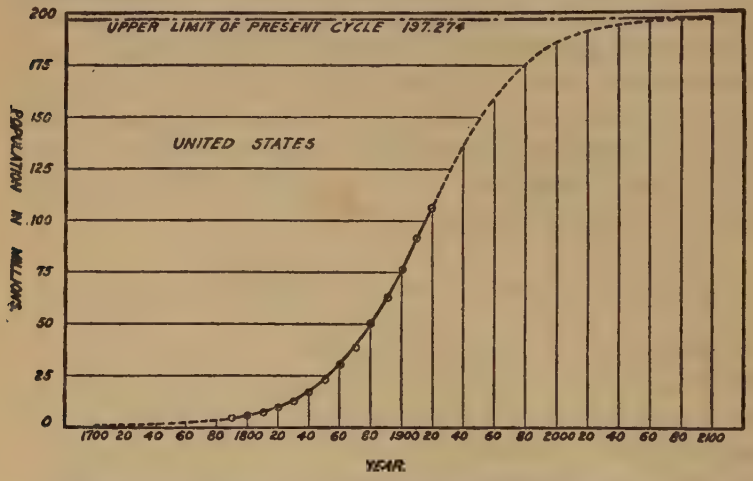
ens, Pearl himself showed that these organisms multiply and replenish the available area according to the same general law as we have seen exhibited by the yeast cells. It occurred to him to see whether so highly complex an organism as man, where reproduction, one would think, is subject to a great many psychological influences and where the population of countries, we imagine, is influenced by a great many economic and political forces, follows this same law

of population growth. It hardly seems possible that the number of human beings, say in Holland or Sweden or Timbuctoo, would be governed by the same iron laws which determine the number of cells in the body of a rat or the number of yeast cells in a test tube. The statesman may be amazed to learn that notwithstanding his ambitious plans the population of his country will grow and come to its limit the same as a tadpole's tail. Yet Pearl's work seems to demonstrate that these astonishing facts are true and that man as a biological organism is no exception to the general onward march of nature.

ULTIMATE POPULATION OF THE UNITED STATES

To illustrate this principle, I reproduce on page 232 Pearl's curve showing the growth of the population of the United States from the year 1700 down to the present time. It will be seen that down to the census of 1920, notwithstanding all our immigration and the enormous open country in the Western states, the same iron law has governed our population development. Pearl applied the same method to the growth of the populations of Sweden, where there has been no immigration, to France, where there has been extensive practice of birth control, and to Japan, where there has been no extensive birth control. One would imagine that the birth rate had been interfered with by these widely differing economic and psychological conditions, but Pearl shows that his curve fits them all. A country is going to fill up in a regular, orderly way according to its food supply and its available area. A pertinent passage from Benjamin Franklin is quoted by Pearl which ought to arrest the attention of those business men who wish to import cheap labor, in order, as they say, "to develop the country and to

carry on our industries." Nature will take its course and fill up the country anyhow. When we import cheap labor, the higher priced stock we already have ceases to produce children. On this point Benjamin Franklin said: "The importation of foreigners into a



Reprinted from Pearl, *The Law of Population Growth.* Courtesy of Alfred A. Knopf, Inc., publisher, New York, 1926.

THE POPULATION GROWTH OF THE UNITED STATES.

It will be readily seen that the growth of population in the United States, notwithstanding all our immigration, has followed the same iron law as that which governs the population expansion of a brood of flies or a colony of yeast cells or the growth of a tadpole's tail. The curve shows the actual census figures down to 1920 (see bottom line) at which time our population was about 105,000,000 (see left line). Evidently, the curve is bound to keep on in a regular way, and in the year 2080 the population of the United States will be 197,274,000.

country that has as many inhabitants as the present employment and provisions for subsistence will bear will be in the end no increase of people. . . . Nor is it necessary to bring in foreigners to fill up any occasional vacancy in a country; for such a vacancy (if the laws are good) will soon be filled by natural generation."

Incidentally, the author of *Law of Population Growth* shows how ridiculous are some of the ideas about population which are held by politicians (and which, indeed, frankly speaking, some of us eugenists have held in the past) when he says:

"The French furnish the world's best example of the benefits (or evils, as you like) of a nearly stationary population. Some of them worry about it, others apparently rejoice. At the moment any candidate for political preferment in that country is likely to be called upon to state whether he is for or against babies, just as in America he is confronted with the awkward necessity of declaring himself wet or dry, or evolutionist or Fundamentalist."

If the reader will glance again at the curve of the population of the United States he will see that Pearl has carried it on up to the time when he believes it will become stationary, which will be about the year 2080. At that time, he concludes, the population of the United States will be 197,274,000. We hear our politicians and our industrial leaders talk in grandiloquent terms of a population of 500,000,000; but when we find this law of population-growth and limit applies to such diverse countries as Austria, Denmark, England and Wales, Hungary, Italy, Norway, Scotland, Servia, Java, the Philippine Islands, the world as a whole, and the City of Baltimore, it is sheer recklessness and naïve assumption to suppose that the United States is inhabited by some "chosen people" that will form an exception to the laws of nature.

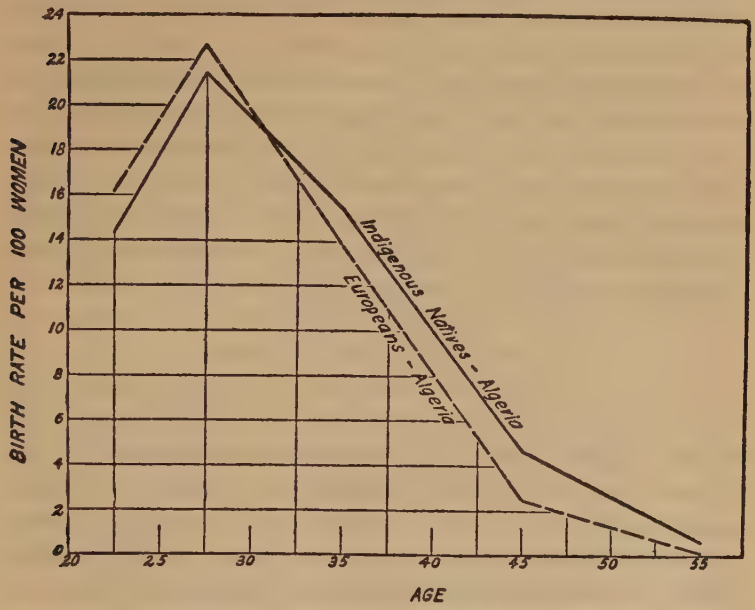
FRENCH-ALGERIAN EXPERIMENT

There is another study by this same author which strongly confirms these laws of population development. In looking about in recent years for some more

crucial biological experiment, upon man, large enough and exact enough to test these discoveries with respect to population, Pearl some years ago hit upon the population of French Algeria, where a unique, large-scale biological experiment seemed to have been especially staged by the entry of the French into that country. Briefly, the facts Pearl found are these: When the French went into Algeria about seventy-five years ago the native Arab population had one of the highest birth rates in the world. The native Arab seemed to live for little else except sex indulgence. The French came in, and have gradually grown to be a large part of the population. They introduced a much higher culture, greatly increased the wealth of the country, and improved general conditions. The French also, presumably, practised birth control extensively. All the evidence Pearl finds is against any theory that the Arab has ever in any way curbed his sexual appetite or made any use of birth-regulation methods. Yet, strange to say, the birth rate of the Arabs at once began to drop, and has since run practically neck and neck with that of the French. This is in spite of the fact that the introduction of medical science and hygiene greatly reduced the death rate among the Arabs, especially among the babies and children. The curve showing the simultaneous drop and the parallel course run by the two racial birth rates is exhibited in the chart on page 235.

Here, then, we have spread before us one of the most significant facts in the whole earthly life of man. It is one to which statesmen could give attention with very great profit. They have always believed that populations would expand indefinitely and that the sole problem of statecraft was feeding them and producing more wealth for them, so that they would produce more children who would in turn produce more

wealth, and so on ad infinitum. We have also had held before us the specter of increasing misery as the population reached the food limit. Pearl does not share this view. As wealth grows, as luxury increases and



From Pearl, *The Law of Population Growth.* Courtesy of Alfred A. Knopf, Inc., publisher, New York, 1926.

Age specific fertility rates of women from age twenty on in the *Territoires du Nord* of Algeria. Solid line—natives; dash line—Europeans.

new interests in life develop by the fact that people are raised above the brute struggle for existence, the birth rate seems automatically to decline until the population becomes stationary; and, as far as material conditions are concerned, the people attain a very happy situation.

By all means the most interesting question which arises out of these discoveries concerning the growth of population is just *why* the birth rate drops as pop-

ulation increases. There is nothing more interesting in recent biology. Animals in a large group will not breed as rapidly as animals in a small group. At the Maine Experiment Station, Pearl showed years ago, hens will lay more eggs when fifty are placed in a pen together than they will if one hundred and fifty hens are placed in a pen three times as large. Although the same amount of space is allowed "per square hen," as Kate Douglas Wiggin put it, yet, for some strange reason, the egg production—that is, the birth rate—automatically declines. The same is true of human beings. This is certainly going to be one of the most significant factors to consider in man's future life on the globe.

WHY POOR PEOPLE ARE POOR

It has long been known, of course, that the birth rate of well-to-do and rich people is much less than that of poor people. Whether it is poor capacity or poor opportunity that makes people poor, they certainly have much more than their share of the world's children. I cannot here present the evidence, but there is an abundance in existence which leads me to believe that the largest single reason—by no means the only reason—why poor people are poor is because they do not possess by nature the ability, temperament and energy to become rich. I am speaking not of particular instances but of large general averages. All mental tests indicate that poor people do not average as high in ability as the middle and upper economic classes. A great many people, particularly the Socialists who seem to imagine that their coöperative commonwealth would make every one equally healthy, wealthy and wise, think this is a pessimistic view. Again, quite the contrary. I have never myself been able to get any pessimism out of the laws of nature. When a man has

accomplished the mental and spiritual achievement of "accepting the universe" and has ceased trying to make it over and ceased hoping that it will suddenly turn out to be something entirely different from what it plainly appears to be, he will find, I think, that he has attained a new happiness, and will find himself quite content to leave the universe alone. Nothing wins in the game of life except courage in the face of whatever comes.

But we have certainly built a grotesque social and economic order if there are no rewards whatsoever for brains, energy and character. If the man who lacks these is as likely to succeed as the man who possesses them, then the outlook for the individual is indeed hopeless. He receives no reward for honest striving, and intelligence and character do not enable him to elevate the social and economic position of either himself or his family. If we fail to find not only more ability and a higher average of virtue among well-to-do and rich people than we find among the poor, who are commonly lauded as possessing all the human virtues, then it means that brains and character are of no use to a man. It also means that we might as well dispense with all efforts to improve these mortal possessions.

It seems biologically unfortunate, however, that just as men do succeed in a social and economic way they reduce the number of children to whom they pass on not only their property and influence, but their natural talents and energy. Pearl's work shows us how populations grow as a whole, but this only partly answers a question of equal importance. And that is, which *types of the population* produce the large families and thus add the greatest contribution to the national reservoir of character and ability? One is bound to infer, of course, since the drop in the birth rate goes along with increasing wealth, that those who

procure the most wealth are the ones who reduce the birth rate the most. This turns out to be true. Pearl gives a list of the property valuations of the various states of the United States. Those with the highest property valuation, such as Connecticut, Massachusetts, New York and California, have the lowest birth rate, while those with low property valuation, such as Kentucky, Virginia, North and South Carolina, have the highest birth rate. Dr. David Heron, of the Galton Laboratory, in London, found that not only is a high birth rate associated with poverty in England, and a low birth rate associated with economic and professional success, but he found also that the factors contributing to this unfortunate differential birth production have doubled in their intensity and effectiveness of operation within the past fifty years. The upper and middle classes—which include not merely rich people, but doctors, lawyers, clergymen, teachers, professors, engineers, stenographers, skilled mechanics, accountants and all people who are intellectually and socially successful and owing to this fact presumably socially desirable—are probably vanishing in all civilized countries. That is, they are probably vanishing *as a class* in every country. There are exceptional types and families *within these classes who are not vanishing* and which give us a new evolutionary hope; I shall later present the evidence in support of this contention.

INTELLIGENT CLASSES DYING OUT

But it seems impossible not to infer that the main portions of the successful classes are simply sweeping themselves into extinction. Recent studies of the birth rate of college graduates by Dr. John Phillips, who has studied the graduates of Harvard and counted their

children, and of Prof. S. J. Holmes, of the University of California, who has studied the families from whom the students of that university spring, certainly give us no comfort, to say the least. Phillips shows that the Harvard graduates are simply disappearing as a species of animal from the face of the earth. He shows also that the native-born Americans are disappearing with extreme rapidity, and that their places are being taken in the Harvard population by the children of foreigners who have recently landed on our shores. This is not comforting to those of us who belong to the old American stock.

Professor Holmes shows that down to 1900 college families in California were probably reproducing themselves. The actual graduates from these families, who are presumably the ablest members of these families, are probably not now reproducing their stock. At least, from all we know we are almost forced to infer that the college families of California have entered a decline in numbers which has started them toward extinction. One could multiply data of this sort indefinitely. Our journals of biology and sociology, as well as the vital statistics of the United States Government, are filled with data bearing out the general inference that the main body of the more successful elements of the population are simply disappearing as biological specimens. I shall ask the reader to note especially here, that I say only that the *main body* of these successful classes is disappearing. There is a saving remnant that is not disappearing, and we shall see as the argument proceeds that upon them rest the chief biological as well as social hopes for the future of mankind. In fact, I shall indicate later who constitute this saving remnant, how they are going to be preserved, what are the influences at work to prevent them from dying out, and what are the new biological dis-

coveries which cause me to believe that they will form the biological basis of a better and healthier race and will usher in the next age of man.

All I shall note at this point is that we discover a great many unexpected tendencies in the way in which man reproduces his species. There are all sorts of currents and counter currents at work to alter the general composition and the general biological trend of any large group of people. We talk glibly of race degeneracy and race improvement. It is highly probable that there are no such things as general race degeneracy or general race improvement in a species of animals as extensive as is the human family. The human race does not go up or go down as a whole. Even in a small community of a few hundred, some families are improving and some are degenerating.

As an example of numerous false impressions about the tendencies going on for race improvement or decay, there is one concerning the birth rate of morons which has, of late, gained extensive credence.

WEALTH PRESERVES STUPIDITY

I am inclined to believe that a good deal of this false impression has been given to the public by over-enthusiastic eugenists themselves. The notion is that morons and stupid people generally have larger families than other people of the same social and economic classes. There is a popular impression that feeble-minded people just naturally tend to have an enormous number of children. Pearl's evidence, and his opinions drawn from this evidence, indicate that there is no basis for this widespread impression. Feeble-minded persons who are poor have no more children than have other poor people. Morons who are rich have no larger families than other rich people. It

is chiefly the economic and social status which is associated with the size of families. It is at least more closely associated with it than is any other feature of the environment that has been measured.

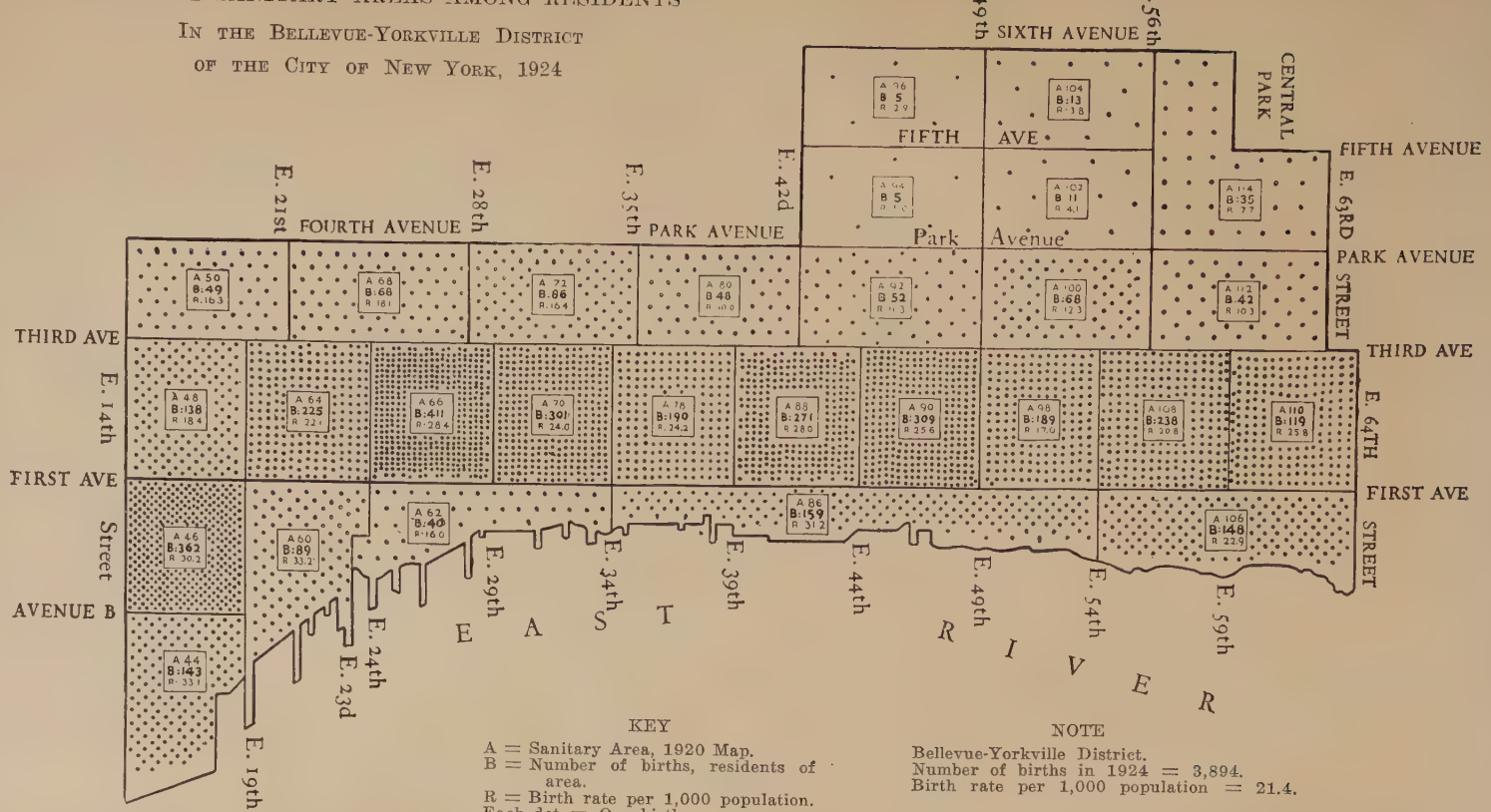
There is another curious influence which wealth exerts upon man's biological make-up. This was called to my attention some years ago by Everett Dean Martin. Since then I have made some general observations which lead me to believe there is a good deal in Martin's suggestion. This phenomenon is that wealth and easy economic circumstances tend to preserve stupidity in the upper social classes. The way this principle operates is very simple. For example, a young woman, who does not have to earn her own living, or one who does not have the intellectual interest and energy to assume some position, undertake some form of social work or display her mental qualities in some special way, can quite readily "get by" in social circles, even if she is merely a high-grade moron. Since there is so much more physical beauty in the upper economic classes than among the less favored sections, it seems probable that even stupidity would be endowed with better looks in these classes than in those lower in the social scale. A woman who is in employment of some kind quickly reveals whether she is intelligent or stupid. But there can be little doubt that a stupid woman, with money enough to preserve her from the necessity of working, especially if she possessed a modicum of good looks, would be much more likely to be undiscovered and to secure a husband than if her real mental abilities were brought out by some occupation requiring intelligence. Even a good-looking moron may pass in society for a person of intelligence, if all she has to do is to learn to ride horseback, swim, dance, dress well with the aid of parents and a maid, look sweet, and keep smiling.

This tendency is by no means confined altogether to the preservation of moronity among the women. Very stupid young men can manage to "get by" in the world, and they often succeed in marrying women much more intelligent than themselves, if they have money and leisure and limousines and the like. One can scarcely visit our fashionable summer resorts, take a trip on a first-class ocean steamer, or attend a few fashionable social gatherings in any of our cities, without gaining an impression that while the average of intelligence in these classes is considerably above that of the general population, yet an undue amount of stupidity is also being protected, preserved and biologically promoted.

I have, however, seen no more impressive picture of the high association between economic success and small families on the one hand, and economic failure and large families on the other, than the one which I append on the opposite page, entitled *Fifth Avenue vs. First Avenue.* I am reproducing it here from the *Journal of Heredity* by the courtesy of its editor, Mr. Robert Cook, and also of the Millbank Memorial Fund. The chart is impressive, and fully explains itself. It certainly seems a strange and pathetic fate that nature has laid upon man, that those among his various breeds who are capable of building civilizations, of creating cultures, of giving refinement and beauty and meaning to his existence, are the very ones who are sterilized by their own achievements. The very persons who lead the race to higher levels die out when those levels are attained, and the race once more slips back down the long, difficult hills of progress. Charles Darwin said, "Man breeds from his worst, but he does not have to." The prime objective of this book is to prove that this farsighted vision of Darwin is true, provided only that civilization can

BIRTHS BY SANITARY AREAS AMONG RESIDENTS

In the Bellevue-Yorkville District of the City of New York, 1924



KEY

A = Sanitary Area, 1920 Map.
B = Number of births, residents of area.
R = Birth rate per 1,000 population.
Each dot = One birth.

NOTE

Bellevue-Yorkville District.
Number of births in 1924 = 3,894.
Birth rate per 1,000 population = 21.4.

Reports, Bureau of Records,
Department of Health, City of New York

Bellevue-Yorkville Health Demonstration
Milbank Memorial Fund

continue long enough to set going a new cycle of evolution. Whether or not that stage of civilization has been reached is the most pressing question that can possibly concern present-day social statesmanship.

IS RACE SUICIDE POSSIBLE?

I believe we have reached the stage where man is about to begin to breed from his better and best, and that biology has made some startling new discoveries which will greatly aid this happy process. Indeed, as an indication in this direction, we have seen how populations grow from small tribal beginnings until they fill the land which they occupy, and that then they remain relatively stationary. We have seen also that the birth rate goes down as civilization goes up. Of course, the reader may ask what would happen if science should suddenly discover or create great new reservoirs of food? As the graphs of population show, this would merely give the curve of population a new upward impulse, and, of course, the ultimate number of persons in the population would be greater than with a meager food supply. But biological history would simply repeat itself, and a point of equilibrium between birth rate and death rate would soon be reached again.

The reader may, then, inquire, How about the general predictions of race suicide? If the birth rate drops with improving conditions, will not the race vanish if science and social organization should be finally able to give everybody a good home, comparative luxury, a public-school education, a radio, a Ford car, and fill their minds with social ambitions?

A few years ago, when Prof. Edward A. Ross, of the University of Wisconsin, invented the term "race suicide," a great many people gained the im-

pression that this meant that the whole race might die out and just as we got ready to enter the millennium there would be nobody left to enter it. Professor Ross merely meant to point out that the more favored social classes were dying out. However, a good many students and popular writers, who ought to know better, have spread the fear that there might be an enormous decrease in the population; in fact, that it might even vanish altogether and the animals might once more take possession of the world. We have had even lurid pictures drawn to the effect that if the size of the families should continue to decrease, this earth would ere long become once more a zoölogical garden, with nothing but the bones of man to indicate that he had ever been here and had won his temporary triumph over the lower kingdoms.

A little reflection will convince anyone that race suicide, in the sense of a race vanishing, is a biological absurdity. Curious as it may seem, race suicide in the long run tends not to a decrease but to an increase of the population. Just how this principle works has never been better described than in a brief article which Dr. Alexander Graham Bell published in the *Journal of Heredity,* shortly before his death. Both because of my personal admiration for Doctor Bell, as one of the finest spirits of our American life and for his numerous admirable researches in the field of eugenics, and the great work he did on the problems of deaf-mutism—most of which good works are unknown to the general public—I take pleasure in reproducing in this place, verbatim, his brief discussion:

"One of the most interesting of the questions of to-day relates to the powerful influence exerted upon populations by what we might almost call negative selection. A selection that produces the very opposite of that expected.

"At the present time considerable alarm has been expressed at the apparently growing disinclination of American women to bear children, and a cry has been raised against what people call 'race suicide.' Whatever the cause, it is undoubtedly the fact that in America the children of foreign-born parents are increasing at a much greater rate than the children of native-born parents, and the position is sufficiently grave for serious consideration.

"The desire to avoid maternity is a characteristic associated with lack of offspring, and cannot therefore go on increasing indefinitely in a community. Its natural tendency is to die out through lack of offspring to inherit it, leaving the more fertile part of the community alone to propagate the race.

"Reflection therefore leads to the somewhat startling conclusion that even wholesale abstention from children, so far from lessening the fertility of the community as a whole will eventually increase it instead. Actual race suicide will not result from such a cause alone, so long as the race is left to itself to work out its own destiny.

THE DESTINY OF AN ISLAND RACE

"In order to appreciate this, imagine our native race to be placed upon an island protected by suitable immigration laws from competition with other races. Then it becomes obvious that the sentiment in favor of avoiding the production of offspring must necessarily diminish in process of time, *on account of the lack of offspring to inherit it;* and that the opposite sentiment of a desire to have children will grow, and ultimately become predominant, because each succeeding generation will be composed exclusively of the descendants of the people who had children. If the desire for off-

spring is an inheritable characteristic, *and it certainly is,* then of course the next generation will inherit it from their parents to a certain extent; whereas there will be no descendants at all to inherit the characteristics of those who abstained from offspring.

"We have placed the people upon an island, and protected them from interference from other races, so as to leave them to themselves to carry on their lives in their own way, as they desire.

"Some of these people love little children, and desire to have children of their own. Others look upon children as nuisances, perhaps necessary evils for the continuance of the race—but why should they be bothered with them when they don't want them? Let others have them if they want them, but leave *them* alone. Well—let them have their desires.

"Let those who desire children have them, and those who don't, have none, and see how it will all work out.

"Now, does it not become at once evident that so long as any of the people desire offspring and have them, complete race suicide is impossible? Some offspring will be produced and a second generation will appear.

"Suppose, for example, the boom against maternity reaches such proportions that ninety-nine per cent. of the population decides to have no children—and surely this is an extreme case—will the race die out? No—not immediately at all events. There will be another generation composed exclusively of the descendants of the one per cent. who desire to have children. The whole of the next generation will be composed of their children; and there will be no descendants at all of the other ninety-nine per cent.

"This is the critical time for our islanders. Only one per cent. of the population have had children, and

of course the numbers in the next generation will be so seriously reduced that immigration from outside would speedily swamp them—but we have agreed to protect them from this competition with other races, and leave them alone to work out their destiny to the bitter end.

"Well, let us revisit the island after the original population has passed away. We find the population now only a fraction of what it was before; and the question naturally arises: Will the population continue to diminish at each successive generation until actual race suicide results?

"It is not to be supposed that the sentiment against maternity will disappear in one generation. The second generation will therefore undoubtedly continue to be divided upon the question of maternity, some wishing to have children, others not; but the *proportion desiring children will necessarily be greater, on account of heredity, than in the original population; for the whole of this second generation are descended from the one per cent. who desired offspring, whereas the ninety-nine per cent. who did not desire them left no descendants.*

"There seems to be no escape from the conclusion that in this second generation more than one per cent. of the people will desire children, and less than ninety-nine per cent. will abstain from their production. Therefore, the proportion of the second generation who will have children will be greater than in the first, and the proportion opposed to maternity will be less.

"Thus in each succeeding generation the proportion who desire children and have them will increase, and the proportion avoiding maternity diminish, with the net result that each succeeding generation will be more fertile than the last. The desire to avoid maternity will die out to a great extent on account of the

lack of offspring to inherit it. *The spirit of race suicide will itself commit suicide, and leave a more fertile race than before.*"

THE HUMAN RACE IS STILL EVOLVING

The reader will miss the prime point of Doctor Bell's argument unless he sees how it indicates that evolution by perfectly natural selection is still going on in the human race. Nearly all historians and also the sociologists of the past generation, such as Lester F. Ward, Benjamin Kidd, Herbert Spencer, and even such biologists as Huxley, Lloyd Morgan and others, believed that natural selection was almost entirely suspended in civilized societies; and the most of them argued that, for this reason, the mean standard of human ability and character was on the wane. It may be that human ability is decreasing. I doubt it very much; but if it is, it is not due to the waning of natural selection, but to the mere fact that civilization has given the lower half of the population the higher birth rate. But natural selection is going on within every section of the population just the same.

As I shall show later, we have no means of knowing whether human ability on the average has gone down or gone up. In his book, *Mental and Moral Heredity in Royalty,* Woods quotes Alfred Russel Wallace, co-discoverer with Darwin of the principle of natural selection in evolution, as saying: "In one of my latest conversations with Darwin, he expressed himself very gloomily on the future of humanity, on the ground that in our modern civilization natural selection had no play, and the fittest did not survive." Woods also quotes Lloyd Morgan's *Habit and Instinct,* where he says: "Natural selection becomes more and more subordinate in the social evolution of civilized man-

kind; and it would seem probable with this waning of the influence of natural selection there has been a diminution also of human faculty."

No doubt, as I noted in the beginning of this essay, many forms of natural selection are suspended by civilization; but it is my purpose to show that other forms of natural selection are substituted which keep evolution going and, possibly, accelerate its pace. The only question at issue is not whether evolution has ceased but in what direction is it going? We are evolving, but what we are evolving into is the question which I wish to consider from now on. Are we evolving into a worse or a better type of man?

WHY COLLEGE WOMEN DO NOT MARRY

Even Alfred Russel Wallace noted the tendency of the wicked and vicious to eliminate themselves by their own folly. As I have said elsewhere, vice purifies the race because it kills the vicious. While this does not raise the upper sections of human ability and character, it does have a tendency to elevate the general average. However, scarcely any large-scale phenomenon now in process illustrates the fact that natural selection is going on, and the way in which it works, more clearly than the marriage rate of college women.

A number of studies show that ninety per cent. of the women of the United States marry before they are forty years old; but fifty per cent. of America's educated women never marry at all.

Is education driving the nation to race suicide? Are culture and Cupid deadly enemies? Does the possession of a college diploma make a woman less attractive as a wife and mother or decrease her desire for marital life?

On the face of the facts, all this would seem to be true. If, however, we survey the marriage situation of the American people as a whole, we find that it was never more encouraging.

More people are getting married in the United States to-day and they are marrying earlier in life than at any time within the past generation. While the general belief is that the number of unmarried women and old bachelors is increasing at an alarming rate, it is comforting to find from the census reports that this is not true.

DISTURBING FACTORS

Marriages have been growing more and more numerous and the time of life when our young people contract marriage has been going down steadily ever since 1890.

We seem rapidly approaching the point where we shall be the most married people in the world.

When we analyze the situation more closely, however, we come upon some disturbing factors. A mass of evidence indicates that the more education a woman has, the less chance she has of getting a husband.

For while the general marriage rate has been increasing, most of the great women's colleges and a large number of co-educational colleges show a slight decrease, and very few an increase in the marriage rate of their women graduates.

The tide of marriage among educated women seems to be setting in the opposite direction from the general current of American life.

ASTONISHING FIGURES

For instance, Prof. Amy Hewes, of Mount Holyoke, shows that in that institution, the oldest of the great women's colleges, back in the 'forties and 'fifties only

fourteen to twenty-four per cent. of the graduates remained unmarried, as compared to fifty per cent. recently remaining celibate.

At Syracuse University in New York the number of unmarried women graduates made the astonishing increase from thirteen per hundred to fifty-two per hundred during a fifty-year period. The foregoing figures and those which follow are taken from the latest records that I have seen.

Running over the records of other colleges as studied by Prof. Robert J. Sprague of Massachusetts Agricultural College, Prof. Roswell Johnson and Bertha J. Stutzman of the University of Pittsburgh, Doctor John Phillips of Harvard, and others, we find that Bryn Mawr, for instance, during a twelve-year period graduated three hundred and seventy-six young women of whom only one hundred and sixty-five, or forty-three and nine-tenths per cent. were married thirteen years later.

Correspondingly, the Vassar graduates show only fifty-one per cent. married, while the records for Wellesley reveal that only thirty-three per cent. of its girls had accepted husbands.

BETTER RECORDS FOR COLLEGE MEN

The marriage rate among men college graduates generally shows little change. Dr. John Phillips has shown that during the past seventy-five years just about seventy-five out of every one hundred Harvard graduates have married and of the Yale graduates seventy-eight per cent. have married.

Prof. Samuel J. Holmes of the University of California sums up the situation pungently by saying, "Over ninety-seven per cent. of Methodist ministers marry, over ninety per cent. of American men of science marry, about seventy-five per cent. of Harvard

graduates marry, and a little over fifty per cent. of the graduates of most women's colleges marry."

From such widely separated groups as the much-marrying Methodist clergymen to the little-marrying graduates of women's colleges it is impossible to draw any common principle, but if we confine our attention to the women graduates of the co-educational institutions we find a somewhat more encouraging state of affairs although even out in the "great open spaces where men are men" it seems that Cupid has a tough time of it on the college campus.

A COMPARISON OF STATES

The picture as given in *The Journal of Heredity* of women's marriages in Western colleges during a twenty-year period runs as follows:

College	Per cent. unmarried
Ohio State University	46
University of Wisconsin	48.2
University of Illinois	46
University of California	40
Leland Stanford University	40
Oberlin College	35
Kansas Agricultural College	32.4

It is interesting to note that at Leland Stanford the rate is increasing, and the same seems to be true at the University of California, where the record given above is not quite complete.

If we turn now from small college groups to the populations of entire states we find that ninety-six per cent. of the "Joans of Arkansas" marry before they are forty years old, while only eighty per cent. of their sisters in Massachusetts are married at that

age. And it hardly needs discussion to prove that the general average of education is higher in Massachusetts than in Arkansas, although the latter state has made amazing advances in this respect in the past twenty-five years.

COLLEGE WOMEN OF UNMARRYING STOCKS?

The foregoing presents an entirely too brief summary of the main facts as to education and marriage in the United States. Will the reader kindly note that I have not so far suggested my own belief as to the underlying causes?

Two solutions have, however, been offered.

It was first suggested that perhaps college women came from non-marrying family stocks and that their sisters, cousins and friends of the same social and economic class would be found to have just as low a marriage rate as their better educated sisters.

Miss Mary Roberts Smith made a study of this point of view from a large amount of data. As given by Poponoe and Johnson, the data showed the average ages at marriage of the different groups to be as follows:

College women	26.3 years
Their sisters	24.2 years
Their cousins	24.7 years
Their friends	24.2 years

Plainly, the sisters, cousins and friends of college women are preferred as wives to the college women themselves.

CHARM AND EDUCATION

Miss Smith further found that if we take college women at twenty-three years of age only eight and six-tenths per cent. have found or accepted husbands,

while by that time thirty per cent. of their friends, cousins and sisters have been led to the marriage altar.

Evidently a great many young women never get as far as college because they are too attractive as wives ever to get that far with their education. Indeed, as we shall see, this may be the very crux of the whole problem.

Another solution proposed is a tax on bachelors. All such simple, ready-made solutions of social problems always fill me with suspicion. As a rule, they are merely personal gestures, and show a naïve conception of the enormous complexities of the question at issue.

A tax on bachelors might unfortunately induce them to marry. I say *unfortunately,* since men who are bachelors by choice have exhibited a personal selfishness and lack of human interests which society can scarcely afford to have reproduced in a brood of equally selfish children.

For abundant evidence shows that selfishness is an inherited trait. In some whole families it is bred in the bone. Such old bachelors should be allowed to hang themselves by their own ropes.

A PROFOUND PROBLEM

On the other hand, men who have remained unmarried because of having to take care of an invalid father or mother or in order to send some younger brother or sister through college, instead of being taxed, should, if anything, be given a pension to enable them to marry and reproduce their noble natures in a group of similar children. And the same is true of women who have given up their marriage chances for similar reasons.

We thus see that the problem as to whether education does or does not make women unmarriageable and lead to race suicide of our intellectuals is far-reaching and profound. When these low marriage rates were first published, especially those for separate women's colleges, several investigators leaped to the conclusion, which, as I have said, seems obvious, that it was the *type of education* and the ideals of college life that led these women to forego marriage or else made them unattractive to men.

One would easily be led to think so when we learn that in one of our largest women's colleges out of one hundred and fourteen professors and instructors one hundred are women, and of these only two have ever married. Such an atmosphere hardly seems conducive to raise the marriage rate of the students.

THE REAL SOLUTION

I think myself that a sound eugenical education from the early grades up through college would not only make many of these young women desire marriage more than they do, but make them much more sought after by young men who have been equally educated in eugenics.

But the real solution is to the credit of Dr. Howard J. Banker, of the Eugenics Record Office of the Carnegie Institution who has uncovered what appears to be the largest factor in the problem. Doctor Banker made an exhaustive study of Syracuse University in this respect. He compared it with the separate women's colleges.

Syracuse has nearly everything which they seemed to lack, namely, plenty of men professors, ample contact with young men, domestic science training, and the like. Yet he found the Syracuse marriage rate for

women and also the birth rate among married women graduates almost precisely the same as for Wellesley. And Wellesley is representative of women's colleges in general.

WHOM THE COLLEGES ATTRACT

I think that Doctor Banker has drawn out of the investigation the true cause, namely, that *college education in America to-day, both in co-educational and separate institutions, gives a type of education which attracts especially a large class of unmarriageable or at least unmarrying women.* It attracts many others also, but the intellectually-minded, serious young woman is particularly drawn to its lofty scholastic life and sees in it more an opportunity for that larger service to society which she craves than she does in marriage and domestic life.

Many of these women would never have married, no matter how they had been educated, for their passions are intellectual and spiritual; and many of them, instead of serving one man, one family and one home, serve a whole community, a state or even the nation.

While no woman can offer a larger service to society than rearing a family of well-born, healthy children, yet there are other vast and necessary services which only women can render. These noble women fill this niche, and it is a very high one in our national life.

EDUCATING THE DOMESTIC TYPE

Doctor Banker points out that the college life and ideals have been the means of selecting from the general population this type of woman, and that the college education has not been the factor that has prevented their marriage.

The lesson to be drawn from all this is, in Doctor Banker's own words, that the present college courses "are well adapted for bringing to fruition the socially valuable qualities which these unmarried women possess." But, he continues, "the college should also provide for the needs of their sisters, whose domestic and motherly instincts seek equally, if less obtrusively, for full development and expression. The result would be to attract to a higher education the woman who is naturally more reproductive."

The highly intellectual women who prefer scholarship and a career to husbands, home and children may be intellectually superior, but Doctor Banker thinks that on the average "they are not superior as the foundation for a great racial stock."

A LACK OF TACT

His reasoning is borne out by the high marriage rate of Kansas Agricultural College, which we found to be 67.6 per cent., and where almost any girl can find attractive courses. Such institutions are thus offering higher education to the more homey, motherly, domestic young women—indeed, we might say, "the old-fashioned girl"—whose mothers have mothered the national stock from the Puritan and Catholic forefathers down.

The highly intellectual girl who is ambitious to become a social worker, teacher, business woman, research student or executive, should be encouraged, as her usefulness is beyond calculation.

Of course, thousands of college-bred young women should get husbands who do not, partly from the foolish fact that when they go to their work in some new community as teacher, librarian, business woman, social worker, stenographer or the like, most of the

college young men have already selected their mates and the non-college young man is afraid of them. He fears a college-trained young woman will think him inferior. Sometimes the college-bred woman uses very little tact in breaking down this diffidence, and misses a perfectly good husband as a result.

This brief argument has, of course, presented only one or two angles of this very large and complex problem. But the young woman of the University of Wisconsin who wrote to one of the investigators perhaps set forth the crux of the problem when she said:

"You ask me why half of the Wisconsin University girls don't marry. I think it is because they never would have married, educated or not educated. There are a lot of pretty girls here and an awfully large number of homely ones, and, for that matter, homely men. A lot of the most attractive girls don't get to be seniors. The freshman class always has the prettiest girls."

Since I have presented proof elsewhere from other researches that beautiful and pretty women have on the average more brains than homely ones, *although the exceptions are legion,* it may be that these pretty freshmen and sophomores who are snapped up and carried off to be wives and mothers represent at least a very high average of intellect.

The pity is that the college course is not attractive enough to hold them a while longer, or else that their lovers are not endowed with more restraint and wisdom, for nothing is more important than the higher education of American motherhood.

Of course, the reader must not gain the idea that the passion to get a husband and rear a family is the sole test in a biologist's mind of a woman's value to society. Their social fitness is one thing, and their biological fitness is another. Many of the noblest and

best women in the world do not marry, and many of them do not desire greatly to marry. Also a great many noble-minded women who would be very happy to marry refuse the most flattering offers because they believe, in this humanitarian age, that it is their particular duty to sacrifice their own personal happiness in order to undertake some large work for the general social good. Consequently, any sweeping notion that merely getting a husband is the final test of either a woman's social fitness or biological fitness would be absurd. The foregoing results present only statistical averages, and for this very reason there are numberless individual exceptions to these generalized results.

NATURAL SELECTION STILL AT WORK

The prime point I wish to bring out by these studies of college women is that natural selection, and what Darwin calls sexual selection, are still in progress. The best adapted to the circumstances of our civilization are the ones who, in a general rough, average way, are the ones that survive. Of course, this process of college selection is almost entirely a sexual selective process, but its net result is the survival of the best adapted. There are a number of other studies, however, which show that Darwin was wrong in supposing that even natural death selection had ceased among human beings. For, when Darwin wrote *The Origin of Species,* the science of biometry, which is the application of mathematics to biology, especially to evolution, was only being invented in the mind of his cousin, Sir Francis Galton. It has taken half a century to apply it with much success to the measurement of evolution in man. By using these new methods, Prof. Karl Pearson has shown, for example, that natural selection does work on human beings just about as

powerfully as ever. He has shown that death is not a random archer, but selects with unerring aim the weak, and leaves the strong to live out at least the allotted span of man. Longevity he finds is a purely inherited trait, the same as brown eyes or curly hair or any other natural characteristic. He concluded after a statistical study of a large group of Quaker families that sixty per cent. of the deaths were purely selective and due to natural inheritance. Dr. A. Ploetz, whom I visited some years ago in London, the leader of the eugenics movement in Germany, proved that the same thing is true among the royal and noble families of Europe. With all their privileges and their command of modern science, nevertheless they inherit their time to die in the same ratio as the rest of us inherit ours. Doctor Ploetz showed that sixty per cent. of their death rate is purely selective and natural.

Pearl sums up, in his book, *The Biology of Death*, all the evidence we have on the subject of the inheritance of death. As he points out, death is the penalty we pay for being biologically such complicated creatures. If we were one-celled organisms such as the amœba we could live for ever. Two biologists, Woodruff and Erdman, have kept one-celled organisms alive through eight thousand of their generations. They grow by simple cell division, a part of the cell simply dividing and making a new cell and, thus, a new individual. When we take a geranium cutting and cause it to grow, we have not in reality raised a new plant, but have simply continued the life of the old plant. In this sense, a geranium plant can be kept living immortally. If left to itself, however, it will die, because its numerous cells cannot continue indefinite expansion; the organism becomes clogged with waste products, the various parts of the machinery cannot continue to work harmoniously, and, most of all, the waste pro-

ducts cannot be continuously removed. The same is true of human beings. Death comes from the sheer complexity of the machinery. But death, in the end, is purely a mechanical phenomenon. If the waste products could be continuously removed, there would be no reason for dying at all. Death would not occur. Keeping a man alive forever is, no doubt, a mere question of the perfection of mechanical technique.

Dr. Alexis Carrel has a segment of the heart of an embryo chicken which he has kept living and growing for over thirteen years. This is longer, by a number of years, than the chicken itself would have lived. If the same processes could be applied to the entire chicken and all its organs kept alive in this manner, evidently the whole animal would now be a living, functioning organism. If we could apply to man the same mechanical and chemical methods which Woodruff and Erdman have applied to their one-celled animals—that is, if we could carry a man through eight thousand of his generations of thirty-three years each—this would give him some two hundred and fifty thousand years of earthly life. Perhaps by that time he would feel he had outdistanced "the oldest inhabitant" sufficiently to be willing to resign his mortal commission to such tender youths as Methusaleh, and explore other realms of being.

Some evidence has recently been brought forward to indicate that death may be due to the development—sometimes rather suddenly—of old-age poisons which did not previously exist. This theory awaits large investigation and prolonged experiment. If this be true and if a means could be found for counteracting these old-age toxins, the lives of human beings might be considerably, or even indefinitely, prolonged. It certainly opens up fascinating realms of speculation.

However, natural selection is still at work in man,

evolving him toward goals that are at present beyond our ken. Even our care for the lives of children, and all of our sympathy and science combined, cannot stay the onward march of evolution but minister to its processes. Mr. E. C. Snow, of the Galton Laboratory, found that a high death rate among babies means a low death rate among older children. Professor Pearson and Doctor Ploetz found the same thing. This means that the weaker and less fit formerly perished, while those of sounder and tougher constitutions survived. But our science saves many weak and frail babies who succumb later, in early childhood. Of course, the reader must not gain the idea that science and sympathy have not to a considerable extent mitigated this ruthless selection of nature. These inquiries merely show that man is a creature of nature and cannot altogether escape its operations.

LONG LIFE MEANS MANY CHILDREN

Everywhere we turn—if our eyes be once opened by science so that we observe it—we see evolution carrying on its immense and inspiring efforts to improve its products. For example, one would not suppose at first thought that if we took a group of a thousand women who had lived to the age of fifty or beyond—that is, past the child-bearing period of their lives—the ones who die at eighty or ninety would have produced more children than the ones who died between fifty and seventy. They both lived the same number of years through the child-bearing period; yet, the longer-lived ones bore more children during that period. It has been shown that this is the case. The longer *potential life* which a woman has, the greater on the average will be the number of children which she produces. This is plainly a natural selec-

tion, an effort, so to speak, on the part of nature to hand on its achievement of longevity and sound constitution to a larger number of children, and to hand on frailty and a weaker constitution to a small number of children. In this way longevity is the means of its own preservation as a characteristic of the race.

Dr. Alexander Graham Bell made an extensive study of the Hyde family in America, with an especial view of bringing out the inheritance of longevity and strength of constitution. He showed from this study that the number of brothers and sisters that a man has are a pretty good indication as to how long he himself is going to live. In families of only one child, fifty-eight per cent. of such children died before the age of twenty, and only four and eight-tenths per cent. of these "only children" lived to be over eighty. In families of nine and ten children, only thirty-two per cent. died under twenty, while nine and seven-tenths per cent., or nearly twice as many as "only" children, lived to be over eighty. In short, Doctor Bell's figures indicate that the number of persons who live beyond eighty steadily increases with the size of the family up to ten children. Put in another way, this means that a child with nine brothers and sisters has on the average twice as good a chance of living to a good old age as has the child with only a single brother or sister or none at all. The plea that we should have smaller families on the ground that we commonly hear advanced—"fewer and better children"—is shown to be a biological impossibility. Doctor Bell was here studying families who in the main lived prior to the introduction of birth control. The institution of birth control would no doubt decrease the actual number of children from those who could potentially produce very large families; but the principle of the inheritance of longevity is not impaired in the least by this factor. However, it is conceivable that, with the introduction

of birth control, those mothers who heretofore have produced only one or two children would still produce the same number; while those who formerly produced from six to ten would cut down their quota to two or three. If this is happening, a thing which I think is highly probable, it will beyond question reduce in time the average length of life of human beings.

We see from these and from numerous other examples that could be cited that Darwin's fear is not justified in so far as it pertains to the slackening of natural selection. We see that longevity has a tendency to select longevity. And there can be little doubt that the group of hereditary factors which give a man long life is the most powerful group in giving him a healthy body and a sound mind. We have seen also that the tendency to produce large families is an inherited trait. Fertility tends to perpetuate fertility, and thus the most fecund members of the race tend to survive. There are all sorts of artificial tendencies—that is, tendencies that are under the control of human intelligence and emotion—which work for, or else work against, these forces of natural selection. But natural selection holds on its way, regardless of the feeble efforts of man to free himself from its relentless sway.

However, all this does not answer that portion of Darwin's question, "Is the natural selection which is going on in man under civilized conditions making him better or worse?" It is this insistent question of Darwin which I shall examine in the concluding section of this essay. I believe that we now have at hand some material which would have given a little comfort, at least, to the author of the most brilliant intellectual generalization of the nineteenth century—the generalization of the origin of species by adaptation and natural selection.

SECTION FIVE
WHO MAKES PROGRESS?

V

HUMAN RACE NOT EVOLVING AS A WHOLE

I HAVE frequently, in the course of these pages, used the terms "human evolution," "the evolution of man," and similar phrases. As a matter of fact, however, no such thing as general evolution of the whole species, as a single, unified process, is probably now going on or ever has gone on. I have merely used these phrases as a matter of convenience. They do not describe any exact, homogeneous process. After the members of any species become numerous and are spread into widely different habitats, with great diversities in their environments and breeding conditions, it is not one grand evolution of the whole species that is going on. The process is broken up into a vast number of processes, and what we might call a large number of evolutions are thus set up. When we come to man, this tendency is much more marked than in any other species. In the first place, he is more widely distributed than any other animal; second, he is much more a master and creator of his own environment than any other animal, and this environment, in turn, reacts upon his own evolution; third, he develops social classes. Animal communities are in the main purely democratic. But man is by nature an aristocrat. He has so many personal likes and dislikes, he has so many varieties of ability and these place him in so many different worldly positions that, even in the same geographical area, he is not one homogeneous, democratic,

evolving species, but a large number of species, varieties and breeds. Each one of these varieties is undergoing its own separate evolution. For these reasons, what is going on in one section of the population may be wholly different from what is happening in some other section. One section may be evolving up, and right by its side another section may be evolving down.

If my contention, already advanced, be true—that civilization is the product in the main of a very small portion of the human race—then the most important question is, What sort of evolution is going on in those portions from which these leaders and creators of civilization mainly spring? If race suicide is really carrying away these sections, if the very blood from which leaders are born is as a whole vanishing, then it is idle to hope for improvement in any section of the human race or in the health, intelligence and character of the human race at large. The masses of men cannot discover the laws of nature by which they might work their own improvement, nor could they apply these laws if they were handed to them gratis by some kindly disposed nature. The difficulty of spreading a knowledge of so simple a thing as birth control among the less intelligent sections is ample proof of this.

HOW LEADERS OF CERTAIN TYPES ARISE

A vast literature has been written upon the origin of leaders and persons of genius. It is evident from all studies to date that leaders arise chiefly in two ways. The first is, that among the millions of marriages of persons who are themselves quite commonplace there is now and then a chance combination of hereditary factors in some particular germ-cell which gives rise to an extraordinary per-

son. Every person carries a good many qualities in his germ-cells which do not show in him. He is unaware of these legacies which he is carrying from his ancestors. If he has good, healthy ancestry, of course these qualities are of a higher grade than if he has ancestors of poor and cheap quality. If there are nothing but poor characters in the germ-cells, nothing but children of poor grade can possibly be born from such parents. But among persons of good, sound natures—such, for example, as the ancestors of Abraham Lincoln—there are always some very fine characteristics. It happens now and then that a large percentage of these fine characteristics become concentrated, by millions of chance marriages, in one germ-cell. The child born from that germ-cell becomes, provided environment is favorable, one of the glories of the human race. The matter has not received the exact study which it deserves, but our meager knowledge of the ancestry of great men indicates that about half of them sprang from parents and ancestors of very moderate ability. At least they are persons of whom none has made notable achievements.

The second way in which leaders arise is by the same biological and social process, only it acts with greater intensity. A new factor also enters; namely, social or military or economic selection. How these factors of social, economic and military selection work has never been better described than by Woods in his *Influence of Monarchs*. Since this work is out of print and unavailable to the reader, I feel constrained to make here a rather extensive abridgment of Woods's admirable discussion.

His argument runs, in the main, as follows: What is going on in one section of the population may be wholly different from what is happening in another class, although the two may be living side by side.

Galton believed that Greek civilization was due in the main to a very small group of families, numbering only a few thousands, possibly only a few hundreds. Whatever may be the differences between the ordinary man and the man of genius, the differences are very great if judged by results. Millions of men may be living in poverty and anarchy, when one man of genius lifts them into wealth and social order. How very important it is, therefore, not to talk of peoples—such, for example, as the Romans, the Greeks, or the English—as though all individuals in each nation were alike. We often hear of the "building instinct of the Egyptians." The Egyptians as a whole probably never had any building instinct. Their architectural achievements were probably due to the building instinct of a few rulers. The Greeks may never have been artistic and intellectual, although a small percentage certainly were. The special faculty for law and government ascribed to the Romans was probably confined to only a few patrician families. The Roman people may never have declined, for the simple reason that the Roman people may never have risen. But a few families have risen in every country that has played a distinguished part upon the world's stage. How these families arose and exerted their influence is of great importance. It is also important to see how wealth exerts an influence upon the biological situation.

THE BIOLOGY OF WEALTH

To account for these facts Woods advances this general hypothesis: Man first made his appearance in a warm country, where he developed life in small tribes. As his numbers grew, the more ambitious pressed into the cooler regions. The colder climate killed off the less hardy and left those endowed with

ambition and energy. Under these conditions, man became adapted to the hunter stage of civilization. Probably such a condition existed for long æons of time in central Asia and Europe.

Now, should any of these northern peoples return to the tropical river valleys they would easily conquer the races that had never had the energy and ambition to force their way into colder climates. The tropical races would doubtless be enslaved. In this way, castes made up of the ablest members of the conquering races would quickly develop. This brings a change within the community, due largely to the great possibilities in the tropics for energetic northern men to accumulate wealth and hand it on. For example, in the hunter stage in the colder climates the accumulation of wealth is not easy. Meat and fish soon spoil. There is no surplus to be striven for among the different groups, no property to be handed on, no rights in land, buildings, cattle, corn and slaves.

When, however, these energetic men return to the tropics and enslave the natives, wealth is rapidly accumulated by the abler invaders. The tropical native is too lazy to acquire wealth. He has no desire to do so. This is because none of his ancestors has ever lived for long periods of time where natural selection would weed out the lazy and thriftless and leave the mentally alert and acquisitive. Otherwise, how are we to explain the great civilizations, such as ancient Egypt and Babylon, that did arise in hot climates? In these regions there occurred the earliest of the great mental awakenings of humanity, the beginnings of architecture and the accumulations of thought.

Now, we have here for the first time the conditions for the production of great military and governmental leaders. An able set of men whose ability and energy have been produced by colder climates in which the

accumulation of wealth was not possible has moved into a region where the accumulation of wealth is a natural phenomenon. A strife at once takes place among these abler men for the wealth. As a result, the ones with the highest organizing and acquisitive abilities rise to power.

At this point another factor enters. These men of wealth desire to transmit their possessions and power. As soon as property is handed on and some fathers of families possess more wealth and power than others, and some sons and daughters are the prospective heirs of more property than others, there naturally arises an ambition on the part of parents to unite their children in marriage with the children of other rich men. The ambitious will be the very ones most inclined to seek such unions. Their craftiness and abilities are handed on. No matter how much mere luck enters into the acquisition of wealth, those will acquire the most property who have on the average the ability so to acquire it. Thus the richer and more intelligent families (in so far as wealth is an indication of intelligence) will by force of marriage unions be brought together, while the poorer and less successful will be left to marry among themselves.

By this process two situations are brought about. The upper classes are separated biologically from the lower classes, and also the upper classes enter a new stage of evolution where they can preserve new hereditary variations around higher levels. This means that while some children would not be equal to their parents, yet now and then one would be born with even higher abilities. Thus the tendency to pyramid their biological gains and to increase their natural abilities is greatly enhanced. It literally happens that "to him that hath shall be given."

Of course, in time a new danger is introduced. By

and by there are so few persons in this supreme class upon whom the whole destiny of the nation depends that any chance misfortune may upset the pyramid and the whole civilization come to a sudden downfall. Beyond question, this dramatic phenomenon has taken place time and again in history. It is commonly referred to by historians as the downfall of peoples, but it is nothing of the sort. The peoples have not fallen, because they have not risen. It is the downfall of rulers. When they pass the civilizations pass.

This, Woods believes, is the true biological account of all the early states of civilization and the creation of those upper social castes which furnished the social and military types of leadership. He has submitted abundant evidence to indicate that the supposed great strength of Spain and Portugal and several other nations of modern Europe has been due to a considerable extent not to any evolution of ability in the people, but to the evolution of ability in the leaders.

"How otherwise," asks Woods, "could the supremely important few have been engendered? The aristocratic force is made up of impulses lying in the germ-plasm. No matter what may be the form of government nor how much the laws of man give power, in theory, to the people, as long as sexual selection tends to mate like with like just so long will the laws of mental heredity work toward the formation of governing classes inherently superior to the sons of other men. Universal suffrage and universal education, the most carefully equalized scheme of social opportunity, cannot prevent this tendency, this splitting up of mankind into sub-varieties, castes and breeds. Nor does all this fail to have a significant relation to the future. It is probable that this separation into castes is increasing rather than diminishing at the present day in all European countries, and

especially in the United States, where the opportunities for acquiring wealth are particularly abundant. Historical science can scarcely at present predict the future, but it can interpret the past. If the work of the world has been initiated and directed by a very few great men, and if these men are the predetermined products, not of outward but of inward differences, the true interpretation of history must hinge upon the germ-cell, and the laws of history will be found to be but a part of the laws which govern all organic life."

We see, then, clearly from all this, that there are two immense tendencies at work, one which separates men into upper and lower classes, and one which leads men of lower classes constantly to try to push up into the upper classes and secure a larger share of their perquisites of wealth and power. This is the crux of the conflict between aristocracy and democracy. They both have their foundations in powerful biological agencies seated in the very constitution of mankind. Right here also is the center of the problem of eugenics. As I shall show later, the more successful classes are disappearing. These are the classes whose intermarriages furnish from two to a thousand times as many of those combinations of germ-cells from which leaders are born as the same number of marriages among the lower classes. Those classes below, among whom it takes thousands and even millions of marriages to produce one great leader, are going to furnish, as a mere census of the birth rate shows, most of the population of the future. If *all* the upper classes vanish by race suicide and from other causes, then all the leaders must come from these rare chance combinations which now and then take place from the numerous marriages of the common and subcommon classes. If eugenics is a hopeless program, as some argue, it is obvious that the future of man is altogether a matter

of depending upon these chance combinations, from which leaders are born, to be numerous enough to supply a complex civilization with its men of genius. We have seen that it is upon these men of genius that civilization hangs. It is my purpose to argue in the succeeding pages that the ablest and soundest members of the upper classes are not vanishing by race suicide, but are already preparing for a large increase in their numbers. I think they are getting ready for a genuine biological expansion, owing to new discoveries in biology. I also believe, and shall endeavor to show, that these new instrumentalities which the biologist has placed in our hands are going to lead to a great improvement, among the common and subcommon classes, in ability, character, health and social capacity. In order to see how these tendencies are going to work, we shall next turn to a consideration of the evolution of *types* of temperament and ability now being developed in the general population.

HOW DIFFERENT TYPES OF MEN EVOLVE

We all use the expression frequently, "That man is of a dominating type." We also speak of others as being of a gloomy or a sanguine or a vivacious type. So far as I can ascertain, it belongs to Dr. Truman L. Kelley (previously mentioned) to have discerned what this means in the analysis of the structure of our mental lives and also in the progress of organic evolution. We have just seen from Woods's analysis that types of men and women whom we might designate as being of the masterful type are constantly evolving. We have seen that the social structure which these masterful types largely originate tends to the perpetuation and survival of their own kind of mental constitution.

Upon this subject, Doctor Kelley recently read a striking paper before the California Educational Research Association. It was later published in *School and Society*. In this address, Kelley gave a new and profound statistical analysis of the processes by which mental types of all sorts arise in the population and perpetuate themselves. He has also shown that there is a similarity between the way any mental trait tends to survive within an individual's own make-up, on the one hand, and Darwin's survival of the fittest, on the other. As a natural result, types of mental behavior which tend to survive and become a permanent characteristic of the individual tend to survive biologically in the population, provided this characteristic is of social value and is agreeable to the remainder of the population. It is perhaps not possible to make quite simple and easily readable Doctor Kelley's statistical methods, by which he proves this position, but I believe his main hypothesis can be made clear. He says:

"To illustrate, two children steal apples and are separately caught. The one deliberates between confessing and denying his offense, but chooses the latter and though his shirt is bulging with apples, he denies that he has taken any and is punished as a thief and a liar.

"The other child, confronted with the same two alternatives, chooses to confess. He expresses remorse and offers to work in order to pay for the damage done, and is rather readily forgiven. The conduct of the second child has had 'survival' value, for it has led to feelings of competency, perhaps buoyancy, emotions which will be welcomed when repeated; while the conduct of the first child has not had such a value. He has had no emotions of a buoyant nature, but rather an unwelcome uneasiness and feelings of general mental incompetency. Whatever the physiological root of

these feelings, Thorndike's law of effect is very serviceable in describing their practical outcome—they tend not to be repeated.

"The little apple-stealing youngster who felt remorse and desired to coöperate and appease the apple-tree owner expresses, and in the future will probably still more strongly express, an attitude which serves in time of trouble. The essential note of his conduct is expressed in the word 'appease.' This may easily become a rule of his life. The said youngster, continuing the line of mental development upon which he has set out, may reach in his adult days the status of a department store floorwalker, humoring complainants while courteously extending the helping hand; or he may become the executive of a service department, or a Governor or a Senator or such a Vice-President as was Marshall, who was nominated and elected because he was always approachable, ready to listen, to smooth out difficulties, and because he aroused no enmities. Such a person is a stable character. His maxim is the same as that of a well-known manufacturer of paint, 'Save the surface and you save all,' for if this individual can make each separate contact agreeable, then all life is so. . . . It is an admirable trait, as is every mental type which has the characteristics of self-perpetuation. From the point of view of mental stability in a social structure, the character carries its own self-protection.

"The remorseful apple-stealing youngster took a firm step in character building when he confessed and felt regret, when he in fact reacted in a *type* manner. What *type* has the other youngster taken a step toward becoming? None at all. His unsuccessful attempt at lying is similar to one of thousands of sporadic variations which get nowhere. We surely can say that, known or unknown to the subject, each

human act, together with its attendant thought and emotion, does or does not impel the individual in a convergent or divergent manner—convergent if toward one of nature's grooves or conditions wherein stability is found, and divergent if toward a condition which ultimately is unstable. The insane person is headed along a tangential or divergent path, and evidence of stability is not in him. Thus, we may look upon the study of types of insanity as the least promising of all mental studies, if the purpose is the determination of normal mental types, unless perchance insane types should assist by clearly revealing to us what *are not* normal stable types. The sex pervert, the introverts and extraverts, the paranoiacs and the maniacs are all headed away from stability. Where they are going is as definite as that of a body tangentially thrown off of a rotating surface. We will not look to such phases of life to reveal that which is enduring in mental structure."

From the foregoing and from other examples, Dr. Kelley argues that relatively large anti-social classes cannot exist, "for I take it," he says, "that if a large class of a given type does exist, this very fact is sufficient evidence that the condition is not anti-social."

TYPE TRAITS ARE NOT CORRELATED

The reader will recall, I trust, that when I was arguing that good traits tend to be correlated I remarked I should later show this rule had certain important exceptions. It is this existence of *types* in the population which constitutes the exception to the rule. I suspect it is this exception to the rule of correlation among mental traits which has made civilization possible. Civilization is probably due to

those who diverge from the average, but whose divergence is not that of the insane or anti-social person but is sufficiently useful and social to perpetuate itself and survive in a large group of people. For example, the dominating traits of men such as Roosevelt and Mussolini are obviously not correlated strongly with the "the-save-the-surface-and-you-save-all" traits of a man such as the late Vice-President Thomas R. Marshall. The autocratic traits of Frederick the Great and Napoleon Bonaparte would hardly correlate highly with the trait of intellectual analysis and the careful understanding of the relationships among social forces. In the presence of a difficult situation, the dominating type such as the men just mentioned beat it down, according to Kelley. They believe in the doctrine that "God is on the side of the army with the heaviest artillery." Roosevelt illustrated this perfectly when he said, "Speak softly, but carry a big stick." But those given to intellectual analysis and the appraisal of conflicting social agencies are persons who, when they have medium intelligence, go into barter and trade. A little higher in the scale they become economists and social investigators. At the top of the scale, says Kelley, they become the "great conciliators of the conflicts between capital and labor, the renowned formula-finders whose plans reconcile international differences, and the great philosophers, from Confucius and Socrates on, whose mental grasp leads to personal contentment through the recognition of, and adaptation to, the harmonious interplay of life's processes."

Such men believe that amid all the conflicting passions of men there is at the heart of things, in the midst of the great human play and interplay, a common formula of action to be found by which men can find stability and live in effective harmony. Col.

Edward M. House and Jan Smuts represent this type, Kelley believes.

The dominant type, such as Roosevelt, Mussolini, Cecil Rhodes and the like, Kelley remarks, "adopted the slogan, 'It pays to advertise,' and then invented the loud speaker to carry it out." "Whatever may be the case," he adds, "for one whose life lies elsewhere, certainly humility and modesty are not virtues for one whose evolution lies along this path. In the more primitive phases, those of this type are men of strong passions whose virtues are personal loyalty and abundant vim. Society's exhorters are of this class; also her revivalists, her community boosters, and many more. Further up the scale, we find her forceful executives and military leaders and, near the top, her occasional empire builders."

The social-service type of which Marshall is a representative is also found in the earnest public servant, the librarian and the happy teacher. In its higher ranges, it takes in such men as Tolstoi and Fra Angelico, and in its very highest reaches Buddha and Christ.

We can see, then, that if all good traits in the adult population were evenly correlated, the mental structure of a community or a nation would be represented by a smooth, regular bell-shaped curve. Those persons who possessed a small amount of the human traits common to all would be at the lower end of the curve, and at the upper end would be those who possessed a great many of these traits. Those at any point on the curve would be mentally all alike. There would be no chance for distinctive social types. Society would be a very monotonous affair, and it is highly probable that great distinctive achievements which lift society forward would not occur. There are, therefore, as Kelley has shown, some traits that

do not extend throughout all the population. If you took a random sample of the people you would therefore find that these traits characteristic only of certain groups "correlate to zero," as the statistician would express it. You can pick out certain groups and find that these particular traits, such as the social-service trait or the analytical trait, correlate *within* these groups. But you would find a great many other people of just as much general intelligence, just as great longevity, health, sanity and the like, who do not possess all of these specific type traits. Therefore, the principle that all good traits tend to be correlated has to deal with this special exception.

MEANING OF SOCIAL TYPES

Of course, every man has characteristics in his make-up which are common to all men. But it is probable that every man also possesses a few traits which he has in common with only a limited number of other men. It is this group of traits which sets him off into his particular group or type. Kelley thinks there are not very many of these type groups, and that they very definitely exist and can be defined and discovered. A man's common traits are, therefore, correlated with those of all other men, but his type traits are "correlated to zero" with these universal human traits. His type traits correlate highly with the type traits of his group. Otherwise we would have no such thing as mental types. Now and then a man has some trait which happens to be annoying to his fellows, such as a tendency to steal his neighbor's goods or his wife, or to set fire to his neighbor's house. His neighbors get together and see that this trait of his does not survive. It is possessed by so few that it is a fairly simple matter to stamp it out. In

a pirate state however, such as was Venice in her early days, this tendency to steal and murder is the very essence of sociability. It is this tendency which creates the group of pirates and enables them to survive. But in civilized society this trait cannot be tolerated and must be ruthlessly eliminated. The consequence is, as Kelley points out, that those type traits which persist in the population are of necessity of more or less social value, and anti-social types, such as criminals, cannot permanently survive. Criminals are merely sporadic and temporary variations from the social average, but they cannot survive long enough to become permanent social groups such as teachers, clergymen, politicians and the like.

We are now in a position, I think, to consider what these facts mean in human evolution. They do not destroy the principle that, in general, good traits are correlated; they merely emphasize the fact that the failure of a few traits of a desirable character to be correlated with all other desirable traits in all individuals makes possible the building up of social groups possessing some outstanding characteristics, such as trade, teaching, social uplift, art and the like.

Now, the building up of specific social groups, endowed by nature with rather particularized mental gifts, is to my mind the most important factor in social evolution. I have already shown from Woods what the building up of military and governmental types has meant in developing the whole civilization of modern Europe. I wish now to show that this phenomenon is going on all the time wherever men come together and become parties to the social conflict. I suggested at the beginning that probably our present industrial order is developing commercial types, sales types, business executive types, teaching and professorial types, mechanical types and the like.

Probably there was in Western civilization, up to recent times, a pretty large pioneering type whose members were always to be found on the "fringe of the frontier." If there were such a type, we can see how it might easily have been perpetuated. It would have a type of behavior which would not only survive within the individual and become an outstanding part of his own personality picture, but by propinquity and assortative mating it would tend to be handed down this type of behavior to a group of children. These would intermarry just as the military types have done, and thus intensify the pioneering traits. I think there can be little question that this same phenomenon is occurring throughout the population generally in the selection and intensification of mental types.

SOCIAL CONIFICATION

I am compelled once more, for the support of this conception, to appeal to the work of F. A. Woods. In order to describe the tendency of persons within a social group to marry each other and intensify the traits which have given character—and, in some cases, social power—to that particular group, Woods has invented the excellent term "social conification." As I understand Woods, by the term "conification" he means that where a trait or a group of traits has enabled certain individuals to make social achievements and bring about social conditions which give them power and influence, there is a tendency for these persons and their families to intermarry and thus to pyramid their biological as well as their social gains. This is due, he thinks, to two forces: First, to the general tendency of like to mate with like—that is, to assortative mating; and, second, to the tendency of like to beget like—that is, the tendency of mental and physical characters to be inherited.

"The question resulting from these facts," says Woods, "is, Do these inner forces, assortative mating combined with heredity, outweigh the environmental leveling and democratic forces? Do nations and social groups, if left to themselves, actually conify—or, in other words, become more aristocratic? The evidence is that they do."

We have already seen that this took place in the royal families of Europe. They intermarried, and immensely conified their talents for war, diplomacy and government. As a result they produced at least twenty men, out of less than eight hundred, whose eminence in these fields will never be questioned. The proof of conification is contained in the fact that most of these twenty persons were closely related by blood.

There can be little question that this same conification of governmental genius has been the determining factor in building up all the great ruling families of history. The Ptolemies were able by this simple biological process to rule Egypt for three centuries. This family was doubtless the largest single impulse in the wonderful civilization of that time. As another example, we read in Prescott and in the fascinating novels of Frank R. Stockton of what a wonderful people the Incas of South America were. I doubt that they were any more wonderful than a great many other Indian tribes. I doubt that the Aztecs were greatly different from the present native Mexicans. I think, as previously noted in *The Influence of Monarchs,* it is probable that in each nation, by the slow processes of selection or conification, a great family arose, the Montezumas in Mexico and the Inca family in South America. I think it likely that these two families were the largest impulses in those great civilizations. At least, the evidence we have so far surveyed as to the causes of social phenomena would suggest this belief.

WORKING CLASSES DECREASING IN ABILITY

There is additional evidence of conification, as Woods points out, to be derived from a study of the British *Dictionary of National Biography.* I have alluded to this fact, and have discussed its meaning to democracy, in my *New Decalogue of Science.* Mr. Alleyne Ireland, in his book, *Democracy and the Human Equation,* also discusses the significance of this phenomenon in relation to the theory of democracy. The facts shown in the Dictionary are these: From the earliest times in Great Britain to the year 1800, the sons of craftsmen, artisans and unskilled laborers furnished nearly twelve per cent. of the eminent men of British history. These same classes during the next quarter of a century furnished barely more than seven per cent.; and during the second quarter of the nineteenth century barely more than four per cent. of Great Britain's eminent men were born from the working classes.

It was Havelock Ellis who first noted the existence of this progressive decline in the production of eminent men by the laboring classes, but it was Woods who suggested its cause and significance. Woods finds in it an example of social conification directly resulting from assortative mating combined with heredity. Democratic opportunity gave a new chance for the ablest members of the laboring classes to rise. They married in the upper classes to which they rose, and intensified the talents which enabled them to rise. We see thus that democracy is apparently at war biologically with itself. Instead of building up the general masses to a higher biological level and making every man a king, it tends to produce an aristocracy by the very opportunity it opens for the ablest men and women in the masses to rise. It builds up the

higher classes at the expense of the lower and thus drains the lower classes dry of their richest blood. Consequently, in the end democracy separates the masses from the dominant classes farther than ever.

Of course, the elevation of these persons of ability to the higher ranks of wealth and social influence might easily lead to a great improvement and elevation of the economic conditions of the masses. This has probably resulted. All classes are in better condition now; they get more of this world's goods and pleasures than they did before this conifying movement began. However, I am not speaking of their economic condition but of their biological situation. Democracy seems to make their biological situation worse. They are bereft of their natural leaders and farther removed than they ever were, from the classes who carry in their veins the blood of leadership. And, as I shall show in a moment from new data presented by Woods, while the common classes have risen the leading classes have risen still farther. As a final result, the two classes are separated both biologically, and also economically and socially, more widely than they ever were.

DEMOCRACY WARRING AGAINST ITSELF

I know of scarcely anything that is so important as to see the biological consequences of any social or political theory. The passion and dream of this age is democracy. Yet scarcely anyone has asked whether it will make men naturally better or worse or whether it will provide the mechanisms for its own biological continuance. Mr. Ireland wrote to me recently, dealing with this matter, to which he has given more attention than anyone else; namely, the application of biology to democracy. He says:

"Recently, in order to secure some kind of confirmation of the figures which Woods and I found, I selected from the first three volumes of the English *Dictionary of National Biography* all the more important names of those persons born between 1700 and 1800. The phrase 'more important' means that the biographies of these persons covered two pages or more in the Dictionary. I thus got a total of one hundred and twenty persons, of which twenty-seven, or twenty-two and five-tenths per cent., were drawn from the artisans, craftsmen and unskilled laborers. I then went through the same process with the names in the supplementary volume which contains almost exclusively the names of persons born since 1825. I got one hundred and twelve names, of which only six, or five and three-tenths per cent., were drawn from these lower economic orders.

"The significance of these figures seems to me to be that democratic opportunity is lifting up out of these lower orders all that is most worthy in them. As this process goes on, these lower orders will be stripped of their higher types of ability and temperament."

We see, thus, that just in so far as democracy works successfully it defeats its own end biologically. While it is an enchanting human dream, yet when we consider the details of its biological machinery, we are forced to ask the grim question, "Will democracy work, not temporarily as a holiday excursion, but as the permanent earthly life of man?"

I think the answer lies right here: If democracy has the vision, the continuity of social effort and coöperativeness, the economic and educational wisdom, to set up those conditions which will discover and promote its natural leaders—leaders not only in politics but in every phase and form of education and

social engineering; if, then, it sees to it that these precious persons and their families more than reproduce their kind and do not consume their priceless breeds in the fires of their own ambitions, then democracy will at least have provided the biological material for its own survival. In fact, after the leaders are found and trained and given power and responsibility, if they do not then commit race suicide, I think democracy, thus provided continuously with its own true, biological aristocracy to guide it, can be preserved as the permanent temple in which humanity can dwell most effectively and happily. But if democracy cannot devise the social medium and stimulus by which the leaders of the race and the creators of culture can themselves make the supreme adaptation of keeping their own breeds going, then, as a student of biology, I do not see how democracy can possibly outlast the present century.

Certainly, this is one of the gravest questions which can confront the whole liberal and democratic theory of civilization. The mere fact that the rewards of free opportunity constantly drain the best ability from the masses; the fact that the vortex of human ambition constantly bleeds the masses whiter and whiter; the fact that education, as we have seen in discussing acquired characters, cannot replace this lost blood of leadership—these facts do not necessarily mean that the dream of democracy will have to be abandoned. This is not a necessary inference. But these facts do mean that these hopes must be abandoned; that democracy and liberalism do sow the seeds of their own destruction; that they will fail as often as they are set up, no matter how grand may be the paraphernalia and pageantry which surround them; that they will, by their own dynamics, periodically plunge men back into a social and intellectual Dark Ages, unless men

have the will and vision to provide a *constant* and *adequate* eugenical remedy for the biological disaster brought about by their own success.

EUGENICS A NECESSITY OF DEMOCRACY

I think myself that democracy—indeed, any form of government yet devised or any type of political society yet undertaken—will periodically fail, unless science has some new remedy to offer for this biological *impasse*. I am beginning to cherish the hope, as I shall show in my concluding pages, that biology does have a partial remedy, at least, to offer for the disaster which the machinations and social ambitions of men have heretofore brought upon themselves. To put it plainly, in my belief democracy and liberalism must espouse eugenics as the very essence and dynamics of their creed, or else they will die. But I believe biology has penetrated far enough into the secrets of man's own biological mechanism, particularly the mechanism of his heredity and reproduction, that it can now offer effective methods, not only for elevating the inborn health, sanity and social power of the masses, but for preserving and indeed multiplying the numbers of leaders upon which the social fortunes of the masses depend. To show the present biological situation of democracy, and to submit these helpful discoveries of the biologist to its leaders, is the purpose the writer has in view. How these discoveries are to be applied, how an effective eugenical civilization is to be built and carried on, we must then leave to the social statesman, the educator and the philanthropist.

Let us, however, look just a little further at what is now going on of social and political significance in human biology. As I said a moment ago, Woods has recently presented new evidence that social conifica-

tion is working just as effectively in the so-called democratic community of America as it has been working in the royal and noble families of the Old World. I lay special stress upon this fact of social conification and its development of types of leaders because I have little doubt that it has been the most effective single set of agencies in bringing about the larger social and political changes in man's history, and, indeed, as has already been said, it probably brought about the thing we call civilization itself.

DEMOCRACY CREATES ARISTOCRACY

These new data on social conification were presented by Woods in a paper at the Second International Congress of Eugenics held in New York City, in September, 1921. The data may be found in full in the published proceedings of this Congress. The main facts are as follows:

The Massachusetts Bay Colony was settled chiefly by three classes of English immigrants. The main body of these immigrants was drawn from the classes of artisans, small shopkeepers and farmers of England, commonly called, in that day, yeomen. Next above these in social standing was a smaller class of officers which Woods designates as "officer yeomen." The third class was made up of a sprinkling of about five per cent. of gentry, who belonged to the recorded gentle families of England; in other words, they had the right to a coat of arms. It is surprising how few members of the landed gentry and of the really noble families of England ever came to this country at all. Woods believes that even of the lesser gentry and peerage of England there were never more than seventy-five families that ever settled in all New England.

It has been a very favorite sport of newspaper

paragraphers and uncritical critics of eugenics to point out that although the early New England families came, in the main, from the middle and even the somewhat lower classes of England, yet they have furnished a large number of distinguished persons to American history. In fact, they have done almost as well as the more aristocratic Englanders have done in their own country during the modern period. They attribute this all to the fact that American democracy has given these middle-class people a chance to show what they could do. This is doubtless true, but not in the sense in which our critics imagine. The chief thing which happened in America was, in my opinion (from Woods's evidence) that it merely gave the immigrants a chance to start a new breeding experiment. In other words, a new selection at once set in. Our critics have not reckoned with the process of conification; they even deny its existence, if they have ever thought about it at all; they have not the slightest conception of how quickly it sets in and how rapidly it works. I frequently get letters from persons in Australia who evidently are of the environmental turn of mind, pointing out that heredity does not count. As proof of this they cite the fact that while the original settlers of Sydney were largely convicts and undesirables shipped there by Great Britain, yet many of their descendants are now merchants, college professors, social and political leaders. There is nothing surprising about this. Instead of being a disproof of heredity, it merely illustrates how both environment and heredity work. Beyond question, the environment enabled a few of the able convicts, especially many who under the old criminal practice of England were naturally able men and were sent there unjustly, to rise, and to start a new selective conification. As I have argued all through this volume, the great func-

tion of the environment is not that it directly alters heredity, but that it gives heredity a chance to operate. As heredity operates, the environment selects out and kills off those who are not adapted to it. In this way the good heredity survives and carries on. It is this which is the very foundation of eugenics; namely, the fact that the environment can be so shaped that it will guide this selection of heredity to higher goals. In this way environment can be made to elevate the heredity of mankind.

Now, this is precisely what Woods found in New England. He first took the Register of the Massachusetts Society of Colonial Dames and from it selected the names of all the families which settled in the Massachusetts Bay Colony prior to 1692. From these he then selected those families which have at the present day three or more members eligible as ancestors for the Colonial Dames, and who now live in Boston, Charlestown, Watertown, Roxbury, Cambridge, Concord, Woburn or Groton. This furnished him a list of seventy-one families or male lines. Out of this seventy-one, forty, whose names are appended in a foot-note, were chosen.* Woods chose this group

*NOTE: Following are the names of the families of the gentry and "officer yeomanry" in Boston and vicinity included in Woods's research into social conification.

Those in the first series are the entire list of the forty studied. In the second list are the preeminent thirteen families of Colonial times. The third list are the twelve families whose descendants have been studied in order to compare their marriages with the Colonial marriages.

(1) Adams, Appleton, Bigelow, Boylston, Bradstreet, Breck, Brooks, Bulkley, Chandler, Chauncy, Cheever, Converse, Coolidge, Dudley, Farwell, French of Cambridge, etc., Frothingham, Hancock, Hunnewell, Johnson of Woburn, Lawrence of Groton, Learned, Lynde, Mather, Minot, Oliver, Phillips, Prescott, Quincy, Russell, Ruggles, Saltonstall, Sparhawk, Stearns of Watertown, Symmes, Tarbell, Willard, Winthrop, Woods of Groton, Wyman.

(2) Appleton, Bradstreet, Bulkley, Chauncy, Dudley, Mather, Minot, Oliver, Phillips. Quincy, Russell, Saltonstall, Winthrop.

(3) Adams, Appleton, Bigelow, Brooks, Coolidge, Frothingham, Hunnewell, Lawrence of Groton, Minot, Phillips, Quincy, Saltonstall.

of forty partly because he knew many of these families personally as they are represented to-day by descendants of more or less prominence; also partly because they happen to be connected with those taken at the start, so that the inclusion of one person led to the inclusion of another as the pedigree charts expanded, until a sufficiently great group of names had been obtained. This gave him a list of three thousand persons descended from the original forty families. There is no reason to suppose that had he studied the remaining thirty-one families whose names are also given in the foot-note, the conclusions would have been affected in any way.

The aim of the research was to select, without bias, a characteristic leading class in America in early days, compare them then with a lower class of that period, and then compare these two groups with similar groups living in the nineteenth and twentieth centuries. The upper class in the early days was separated from the lower class by only a moderate interval. The striking fact is that the *upper portion of the body social, as represented by the descendants of these same gentry, is more separated from the mass to-day than it was in Colonial times.* At least, in two very important respects these two classes are now more widely separated from each other than they were in those days. The first is wealth and the second is intermarriage. Intermarriage between the yeomanry and gentry—that is, between the lower and upper classes—in Colonial days was very common. Such a marriage now is so extraordinary that it is exploited in big head-lines across three or four columns of our daily newspapers.

THE MILLIONAIRE APPEARS

For example, Woods finds that the average yeoman

of that day possessed, as shown by wills and other documents, from $500 to $1,500. If a man possessed more than $1,500 he was permitted to wear lace on his clothes. There was a law that a man worth less than this could not wear lace. The well-to-do yeomen, and the officer-yeomen and gentry, often possessed from $2,500 to ten or fifteen thousand. Robert Kane, one of the richest men, left in 1656 an estate valued, roughly, at $12,500. Captain Thomas Brattle died in 1683, leaving an estate of £7,827; roughly, about $40,000. One historian, Savage, states that this was "probably the largest in New England."

Thus we see that the very richest men were not more than fifty times as rich as the average. By the year 1750, a hundred years later, a few fortunes are listed at half a million dollars each. This would make the very richest man at that time perhaps three hundred times as rich as the average citizen.

By the year 1851 the millionaire had actually begun to appear in America. A number of persons at that time are given in various records as possessing a million each, and one man is listed at three millions. This was probably six hundred times the wealth of the average. Of course, the average wealth had no doubt risen somewhat, but the supreme wealth of the few had risen relatively faster.

In Woods's own remarks on this point he says: "The differences increase as we approach the present day, during which time many persons in New England have left estates valued at twenty millions or more, that is, several thousand times the average. If we consider the United States as a whole, the very richest men to-day, those who are worth $100,000,000 or more, are certainly as much as 10,000 times to 100,000 times as rich as the average. There can be no question, as far as the distribution of wealth is concerned, there

has been in America a process of conification. The average wealth has risen somewhat, but the point of the cone has risen faster than the mass. If the mass be represented in a graph as being 6 inches high, the top of the drawing, representing the very rich, would have to be carried up at least 5,000 feet in the air."

INTERMARRIAGE OF RICH AND POOR DECREASING

Let us now turn to the question of intermarriages. We commonly think of the classes being very strictly separated in Colonial days. They were strict about some matters of precedence, such as the way in which they were seated in church and the way in which their names were arranged in the college catalogues and a few other matters of this sort, but, as Woods says: "When it comes to the matter of marriage and intermarriage among the three different social classes; that is, between the yeoman and the officer-yeoman and gentry, we find a surprising lack of just this class distinction. There is certainly no better test than intermarriage between classes to show whether different castes mingle freely in a social way. At least, this is the biological or eugenic test par excellence, as it is the one which determines the heredity of the next generation."

Of course, the gentry intermarried among themselves freely, as they do everywhere. Characteristic families of this description are represented by those of the Governors of the Colony such as Dudley, Bradstreet, Winthrop and Saltonstall; also the wealthy Russell family of Charlestown, and the ancient pedigreed families of Bulkeley and Chauncy. There are thirteen of these families prior to 1721 which Woods selects out of the total of the forty families studied as being preëminent in wealth and social position. But

even among these who represent the *crème de la crème*, there are a good many examples of marriage with the yeomanry.

In order to make the classification as unbiased as possible, Woods had Mr. J. Gardner Bartlett, the eminent genealogist, of Boston, assist him in determining who should be put in the upper and who in the lower grades. It is probable that there was no man in New England better qualified to do this than Mr. Bartlett. Out of the forty families (male lines) included in the entire study, thirteen, as I have already noted, were finally selected as undoubtedly belonging in the highest social position during the period prior to 1721. Their names are given in the foot-note on page 292.

The research disclosed the surprising fact that out of two hundred and four marriages prior to 1721, forty-eight of them—that is, twenty-three and five-tenths per cent.—were marriages of the children of these preëminent gentry with the children of yeomen. In other words, nearly one-fourth of these cases were cross-marriages between the upper and the lower classes of that day.

In order to corroborate so astonishing a fact, Woods then made a careful examination of a volume known as the *Memorial History of Boston.* It is a standard work of four volumes prepared by a group of scholars and specialists. Concerning the facts of social history in this book, Woods says: "Here were a good many names not included in my research. These were families strictly associated with Boston and not with the outlying towns. Fearing that my own list did not represent a true selection of the most important names and so might falsely over-estimate the amount of cross-marriage of gentry with yeomanry, I looked up the records of the first seventeen

of these families and found that the first hundred marriages yielded again approximately twenty-three per cent. of cross-marriages between the upper and lower of the same three grades."

So much for the interchange of blood between the upper and lower classes in Colonial times. Let us next contrast these conditions with what has taken place within the past hundred years. Woods selected twelve families *descended from the forty included in the first study.* These are all families which have had during the past century, as nearly as could be judged, the greatest amount of social and financial prominence. Their names are also listed in the foot-note on page 292. Woods states the conclusion from this research as follows:

"The result of looking up the records of marriage and parentage in the 12 families that happened to be included shows within the last century that out of 152 marriages, at least 143, or over 94 per cent., are certainly marriages within their own class. There are not more than two instances of known marriages distinctly outside the social class to which these people belong. The parentages of a few of the persons who happen to fall within this group are very difficult to trace in any printed records; probably most of them came from a class somewhat between the two extremes, persons such as for the Colonial period we have called officer-yeomen. But it is not necessary to know the exact ancestry of these few persons. Even if they are considered as yeomen, nevertheless the percentage of cross-marriages of gentry with yeomanry has been reduced from 23 to less than 6. If we look at it in another way, out of 204 marriages from families of the gentry in the earliest period, 119, or only 58.3 per cent., were within their own grade. During the modern period—that is, between 1820 and

1920—at least 94 per cent. have been strictly between members of the same social class. The tendency towards caste marriages has increased markedly and has increased recently.

"These facts, taken in conjunction with the increasingly uneven distribution of wealth, prove that social conification does take place. It is probably inevitable whenever a population, at first composed of comparatively similar persons, lives in a territory where inheritable wealth can be acquired. It is probably working all the time in all civilized countries, though it may, since it requires several generations to show its results, be masked superficially or buried under the wreckage of revolutionary debacle.

"Recently, in Germany, Austria, and Russia, for instance, there have been gigantic examples of the breaking down of cones. Probably many social cones tend to break, some for one reason and some for another, as they become over-conified or too much pointed at the top, but they certainly tend to form, and it is merely to bring forth statistical and historical evidence of such formation that the present research has been prepared."

A most interesting side result comes out of this research. It has long been known that people of the upper social classes make far greater achievements and furnish a much higher percentage of persons who become famous than do the lower orders. We have just seen evidence of this worked out by Ellis, Woods and Ireland, from the English *Dictionary of National Biography*. There is abundant other evidence in researches by Galton, Cattell, Odin, De Candolle, Clarke, Cox and Terman. In finishing the study of his Colonial families, it occurred to Woods to see how many distinguished persons had descended from the 204 members of the old Colonial gentry whose marriages

he studied. These ancestors were *selected not for intelligence but strictly because of wealth and social position* in the early days. It should be remembered that about three-fourths of these persons married in Colonial times members of the gentry, and about one-fourth married into the families of the yeomenry. Among their descendants who would rank at or above the standard of inclusion of *Who's Who in America* Woods easily counted nineteen persons, many of them very famous Americans. The names are as follows: Charles Francis Adams (born 1809), Charles Francis Adams (born 1835), Henry Adams, Brooks Adams, Dr. Henry J. Bigelow, Phillips Brooks, Algernon T. Jefferson, John Randolph; Julian L. and Archibald C. Coolidge; the Rev. Nathaniel, the Rev. Octavius B., the Rev. Paul and Louis A. Frothingham; Amos A. and Bishop William Lawrence; Dr. Charles S. Minot and Wendell Phillips.

While it is a very common national sport to belittle the financial ability of the sons of rich men and families whose members are born to wealth and high social position, yet, as a matter of fact, there can be no doubt that there is going on now an immense conification of the financial ability of the world. Wealthy families, as never before in history, are meeting each other at the pleasure grounds and watering places where they congregate and on steamships and the like, and their sons and daughters are intermarrying and building up cones of financial genius all through the leading countries. There is no doubt in my mind that, whatever it is in human intelligence, temperament and physique which enables men to acquire wealth, these qualities are being powerfully conified by this intermarriage process. These wealthy families are building up financial genius, just as in past ages military genius has been built up, by intermarriage and conification.

These families are going to control the world for a long time to come. They will be, of course, to some extent recruited from the ranks. They may even, for their own good, devise measures, such as profit-sharing schemes and the like, which will give better opportunity for a man from the ranks to rise than he has ever had. These schemes may also distribute wealth more widely and generously than ever before, and bring about a greater general well-being than otherwise would be possible. We have seen that the great and able monarchs, by the very fact of their high ability, enormously and suddenly increased the well-being of whole nations, when their genius took charge of public affairs. For these reasons, I have no fear that this conification of financial genius means oppression of the masses or a decrease in the opportunity of the common man. *I never have any fear of genius.* It is about the only thing in the world that we do not need to be afraid of. The thing I'm afraid of is always the second-class man. When he gets into power, the liberties of men are put in jeopardy, and the wealth and well-being and opportunities for the free pursuit of happiness of common men always decline.

WEALTH DOES NOT RUIN MORAL CHARACTER

We hear, of course, a good deal about the "gilded fool." The reason we hear about him is because he is so rare. The majority of fools are poor, their families are poor, and they are not gilded in the least. Along with this is the well-nigh universal impression that the sons of rich men nearly all go to the devil. Again, it is because this phenomenon is so rare that it attracts attention and gets on the front page of the newspapers. It is true that, even in these times of prohibition, rich men's sons can purchase champagne and publicity and

go to the devil more conspicuously than poor men's sons. But there is no evidence that they do so at any higher rate, in proportion to their number, than the sons of poor men. The majority of the much advertised "poor little rich children" are rather better behaved, although not conspicuously better behaved, than average, unselected children. No one can visit a large number of private schools all over the country, as the writer has done, and not be impressed with this fact. These schools are composed very largely of the children of the wealthy, with quite an extensive sprinkling of the children of the more successful professional classes. Most of these are what I should call pretty well-to-do. Their incomes range from $5,000 up. One is, at least, not impressed on visiting these select schools with the idea that the students are notably worse than those in our public schools or junior colleges. Their average moral reactions are somewhat better. Part of this good behavior is, no doubt, due to superior home training. I should not be surprised if a good deal of it is due to that. But this in itself is due quite largely to the good, inherited intelligence of the parents. Part of this good behavior, however, we have ample ground for believing, is based on the inherited intelligence and moral character of the young persons themselves.

My point here is that if our economists succeed in devising means whereby an enormous number of our people get rich, it will not ruin the moral character of the country. "Ruined by too much money" is an immemorial adage. But there is not the slightest evidence of a crucial nature that money in itself ever ruined anybody. People can exhibit their ruination more widely if they have the money to advertise it; but if money really ruins people or is in any sense a moral danger, I do not believe we have any knowledge

of it. It may be true; but, if so, nobody has devised the critical methods necessary to prove so unexpected and important a fact in the biological, as well as social and economic history of mankind.

But the prime consideration which I have wished to advance in this section is that leaders arise in the population by perfectly natural and not by mystical processes. If this be true, then one of the great tasks of eugenics is to discover these leaders, and promote those conditions of civilized life which will increase their number and lead to the reproduction in still greater numbers of those classes of the population from which they spring. In the next section I wish to examine the problem of what conditions now obtain for the recognition of our leaders in social and political life and for the replenishment of their ranks.

SECTION SIX
OUR VANISHING LEADERS

VI

OUTSTANDING FACTS OF HUMAN NATURE

Before considering what the writer believes is the next step in man's earthly life, let us look back for just a moment over the features of human nature which we have so far considered. We have seen that civilization, instead of stopping evolution, merely changes its trend and probably sets it going at a higher pace. We have also noted that while civilization runs counter to a good many traits which man found useful in his prehistoric days, yet, notwithstanding this fact, civilization is after all mostly a natural product, the outcome of a great many of man's inborn, fundamental passions and desires. The so-called "natural man" is commonly pictured, especially in theological literature, as being only the evil portion of human nature. The natural man is supposed to be at war with some sort of a hypothetical "good man," or "spiritual man." This good man always appeared to me to be the natural man with all the fun taken out of him. Pretty nearly everything which a man desires to do has—in modern times, at least—been pictured as being "natural" and therefore bad; and almost everything that he does not want to do has been pictured as being spiritual and therefore good.

However, I trust the considerations so far submitted have indicated, at least, that the good which we find in human society is mostly the outcome of the natural goodness that is in men. Just trusting to

general observation, the thing that continually astonishes and delights me, as I go about the world, is the enormous amount of goodness in human nature and the little amount of badness. There is scarcely any end of goodness everywhere we go. The mere fact that in the midst of hundreds of millions of people a little child of five or six years can be put on a train at New York with a tag around its neck, and supplied with a basket of provisions, and shipped safely to San Francisco, impresses me with the idea that there is not a vast amount of innate deviltry in human nature. It seems to me that on the whole man is a pretty successful evolutionary product. There seems to be an almost universal willingness to do the right thing. The question in my mind is whether there is enough sheer intellectual ability to make this good will socially effective in wise ways and to keep so enormously complicated a machine going as a world-wide, scientific civilization. The prime difficulty, as I have noted, is to keep society going and not set up at the same time those tendencies which will cause too much moderate and low intelligence, and too little high intelligence, to survive.

LEADERS DO NOT LEAD TO-DAY

As a matter of fact, it is not because of any natural wickedness in men, but partly because of a lack of education and partly because high intelligence is so unique and rare a thing that it cannot be understood and appreciated by mediocre intelligence, that we have to-day, especially in America, one of the strangest spectacles in all human history. This amazing spectacle is that in the main *our leaders do not lead.* While this scientific civilization is chiefly the product of a few men of supreme genius, nevertheless much of

it is under the management of second-class men. We rarely find our really first-class and great men in control anywhere. While we have the most complicated society that men have ever constructed, yet that society is not in control of the men who created it and made it possible.

It is no purpose of mine merely to utter a few rather obvious criticisms of the low state to which American political life has descended. But it is certainly not encouraging that, just as the problems of political government have become larger, more numerous and harder to solve, the American people send more and more mediocre and stupid men to their legislatures and their National Government for the purpose of solving them. One investigation has shown that fifty per cent. of the members of these legislatures have never had a high-school education, and a very high percentage of the members of our Congress have never even attained that small modicum of education which is attested by a college diploma.

CONSTITUTIONAL GOVERNMENT IN DANGER

Discussing this point of the failure of our real leaders of to-day to control, some years ago, in the *Century Magazine,* Mr. Alleyne Ireland wrote perhaps the ablest analysis of the operations of constitutional government that has been penned during this generation. Mr. Ireland showed that if the present delinquency of government is not somehow remedied, the Bolshevists, the Syndicalists, and other revolutionary factions will take the control of government away from those who believe in the present constitutional government of our nation. The reason for this is, as Mr. Ireland says, "the circumstance that every group of anti-constitutionalists has a clear and well defined plan

to offer for the regeneration of the politico-social complex, while the constitutionalists have nothing to offer which is less illusory than the renewal of the very promises which the world has been finally driven to regard with the deepest distrust. If the constitutionalists cannot do better than this, nothing is more certain than that, sooner or latter, the control of Government will be taken away from them."

For this situation, Mr. Ireland proposed a definite and comprehensive remedy. He has lived under twenty different governments and has made extended analyses of the operation of governments in various parts of the world. A number of his analyses have had much influence upon large legislative measures. Out of this experience, probably unequaled by that of any other living student of government, Mr. Ireland made the following suggestion, which I quote from his stimulating paper:

AN INSTITUTE FOR THE STUDY OF GOVERNMENT

"Establish an International Society for the Scientific Study of Comparative Government, supported partly by membership subscriptions and partly by endowment. Let this society conduct, through the agency of an International Research Institute, a *continuing* investigation, of the highest scientific character, of every question of form and function in government—on the basis of a wide comparison—and upon the results of these investigations let it establish in respect of every function of government the correlations between aims, methods, costs and results.

"This Society will have to conform, in its structure and its operation, to certain rigid conditions, if it is to acquire the authoritative standing upon which the whole of its usefulness would depend."

Mr. Ireland then enumerates what these conditions must be as follows:

"A. The Society must be an absolutely new society, and must not be made up by amalgamating societies and institutions now in existence.

"B. The Society would operate through a research institute. Government itself cannot perform effectively the work of such a research institute; first, because its analysis of its own operations could not be made scientifically objective; second, because government, having the power to enforce its views, is under no pressure to find a scientific solution for its problems; third, because the people could never be brought to believe that its enquiries were not tainted by political partisanship. The executive authority of the Institute would be located in a committee of scientists, men of the highest distinction in one or the other of the analytical sciences.

"C. The investigating staff would not be gathered together as a permanent body within the Institute. Each investigation would be assigned to a staff of specialists drawn from different parts of the world, on temporary appointment. This arrangement would have two highly important results: First, the investigators would not develop an institutional psychology, of which the effect usually is to divide a man's loyalty between the pursuit of truth and the desire to shield the reputation of the Institute or of one or more of its employees. Second, as one investigation might be undertaken by a Dane, a Scotsman and an Australian, and another by an American, a Frenchman and a Russian, the work of the Institute would reflect all that was best in the science and culture of every nation.

"D. The work of the central staff would consist in analyzing and publishing the reports of the investigators.

"E. The Research Institute would have nothing whatever to do with propaganda or with the advocacy of any course of action. It would hold itself rigorously to the single task of making knowledge about government available to all. Its sole interest would be *truth*.
"F. The Institute would have to have sufficient money to enable it to secure the services of the most able and experienced men living."

If the reader will reflect upon the utter difference in method and aim between the investigations of such an institute and the investigations made by government commissions—such, for example, as the present investigation being made by the Senate of alleged irregularities in the election of some of its members—he will see that the object of the former is solely to arrive at truth; while very often the object of the latter is to arrive at a partisan solution of the difficulty in hand, and gain votes for the next election. It does not reflect upon the honesty of the men who make governmental investigations to say that very often their object is not truth but party loyalty. And even at best, all reports by governmental commissions are merely descriptions of government in its own terms, whether these be made by friends or enemies. A man's description of himself has been found by psychologists to be usually far from the truth, although he does his best. Again, if he is described by his friends he is rated too high, and if by his enemies, too low. The same thing happens in government, and on a large scale, affecting the lives and fortunes of millions. The difficulty is, however, as Ireland suggests, that the chief wish of government is to enforce its views. If a bad man had friends with the power to enforce the view that he was a good man, or if a good man had enemies who could cram down the throats of the world that he was a bad man, we would have precisely the

same situation as we now have in every form and type of governmental investigation. Government has no object in finding the truth; the very condition of its existence is not that it find the truth, but that it shall carry out the thing which it wishes to do.

Since Mr. Ireland announced this comprehensive plan—which I think is the most hopeful thing of our time—for bringing a real remedy into the vexed and vexing maelstrom of governmental affairs and operations, a number of publicists and societies have announced somewhat similar, but much less definite and comprehensive, plans for linking human learning and science with the art of government.

MEN OF WEALTH REFUSE TO LEAD

I have cited this paper of Mr. Ireland's at length for two reasons: First, because I believe that the introduction of science and its analytical methods into human government, or the failure to introduce such methods into government, will have far-reaching consequences in the future biological and eugenical evolution of man. (It would require another volume the size of this one, and also a good many researches which have not yet been made, to set forth what seems to me to be the eugenical influence of good and bad government.) Second, Mr. Ireland's paper shows how discouragingly little interest people generally take in securing real leaders in their government, and their contempt and neglect of the men who are the real intellectual leaders of our time. I might be permitted to make a personal reference in support of this point. When Mr. Ireland announced his comprehensive plan for bringing intelligence and science into government and preserving the constitutional rights, liberties and pursuit of happiness of the common people, I was so struck with its

obvious wisdom and common sense that I dropped all of my other work and spent several months in endeavoring to assist Mr. Ireland in a joint effort to raise a fund of at least ten million dollars in order to get such an Institute under way. It seemed to me the need was pressing and the situation critical. I have not changed my point of view in this respect. I think that men of wealth, if they discern what is *really happening,* will see that immense forces are going on underneath the surface, which if not forestalled by the introduction of intelligence, common sense and science, into government, will in no great time result in their having their wealth taken away from them. If any such economic debacle as this should come about, I personally am as much interested in what I think would be the unfortunate biological results as I am in the destruction of constitutional government and of the development of our liberties. However, after some six months of work on the part of both of us, during which time Mr. Ireland expended a large portion of his private funds, and during which time the plan was comprehensively submitted to a large number of men of wealth and political power, one generous soul finally donated ten dollars towards our proposed fund of ten million dollars in order to provide the two or three hundred millions of people of the Western World, whose fortunes are, I think, largely at stake in some such enterprise, with an International Society for the Scientific Study of Comparative Government!

The astonishing thing was that the men whom Mr. Ireland approached and the men whom I endeavored to interest in this simple and common sense undertaking were among the real leaders of America in point of intelligence; and most of them were men of large wealth. But notwithstanding that they are America's leaders, *to a man they refused to lead.* Of course, the

proposal may not have been presented with sufficient prestige and personal eloquence. I hardly believe, however, that this was the cause of the refusal, for the simple reason that, without exception, every man was immensely enthusiastic over the project. Not a man who did not say with great emphasis, "It is a supreme necessity, it must be done." But also without exception each man said, "I do not believe I should lead in such an enterprise." I could give more details of this experience, but I think it is a little straw which shows the way the currents are flowing. And these currents, it seems to me, are steadily sweeping the second-class man into power everywhere. I was talking with Everett Dean Martin the other day on this important matter. He said:

OUR VANISHING LEADERSHIP

"The modern world is a ship with an empty pilot house, speeding through a fog. The lack of intellectual leadership in political matters is a subject of frequent comment, but few of those who have noted this fact realize that the same lack of leadership extends to other spheres of human interest and activity. Everywhere, choices are determined and behavior is influenced by impersonal forces, by economic considerations, by the aims of organizations, the prejudices and passions of the 'man on the street.'

"Scholarship we have, and we pride ourselves upon our great scientific progress; and yet outside the popular acceptance of scientific inventions, scholarship and intelligence are tangent to the circle of our common life, not penetrating its circumference. Our intellectual leaders simply do not lead, and this fact is, I believe, new in history. The masses in China, Greece and India respected and followed their teachers. The

same was true of the Middle Ages, and of the ancient Hebrews whose rabbis had a tremendous influence on the daily life and choices of the people.

"In contrast with this, consider the present leadership in religion in America. How many real scholars are there in the Protestant ministry in this country? No doubt, there are scattered here and there clergymen who possess rich knowledge and genuine appreciation of values, but one scarcely hears of them. The leaders are almost to a man ignorant and narrow-minded men. We moderns look back upon the Middle Ages as an age of ignorance and superstitution; but I believe it is fair to say that at no time in Christian history has the leadership in matters of religion been more ignorant than it is to-day in Protestant America. A similar situation exists in journalism, and until recent years has prevailed in our literature, notably the novel.

"Scholars are frequently criticized for their alleged aloofness. I do not believe that they are essentially disdainful and aloof, but rather that life is so organized and standardized that the rare, the subtle, the profound and the sincere can scarcely get a hearing. With our quantity production in matters spiritual, the syndicated article, the organization of education, the desire for quick 'turn over' on the part of the publisher in the exploitation of the best seller, all these and other characteristics of our organized life give to the 'man on the street' a power to decide which values are to survive. Heretofore, this power has been exercised by the educated. To-day, it is exercised by the uneducated; and we cannot have a civilization until people learn to respect some things they do not clearly understand. The most serious problem in modern civilization is that of the restoration of intellectual leadership."

Not everyone needs to endorse all of the severe

phraseology of Mr. Martin in order to agree, as I do heartily, with his general point of view. Not only has religion in America fallen under the dominance, to a great degree, of second-rate minds, but there are signs that even education itself—which, after all, is man's chief spiritual salvation—is trending in the same direction. While I believe that America is to-day standing at the beginning of a great fulfillment, a fulfillment of art, leisure, manners, appreciation of beauty and science—in short, a great renaissance of humanism—yet I believe the agencies of this fulfillment are working mostly outside the field of education and religion. One of America's ablest, and, therefore, most conservative psychologists, a man who has had a distinctive influence upon American education, and who has done notable original work in the measurement of mental quantities, said to me just the other day:

"College professors are as a rule not very able men. I know the mentality of hundreds, perhaps thousands of them; I have worked with them for a generation; as men of sound character and good intentions, I have the utmost respect for them; but their actual mentality will not average very high. I wish we could draw our ablest men, at least a much higher percentage of them, into education. Of course, we have quite a number of the ablest men in the world, but the men who have originality in research or personal inspiration, charm and leadership—oh, they are so rare!"

We must remember, of course, that this man's ideals of what makes the big, all-round, inspiring college professor are very high. But *can* they be too high? As I write this very passage, my eye chances to fall upon an article in the *Scientific Monthly* which the postman has just left on my desk. It is entitled

The Passing of the Professor, by Dean Otto Heller of Washington University, St. Louis. I do not know that Dean Heller would altogether agree with the foregoing remark, nevertheless, I quote from his discussion the concluding paragraph, which is certainly not precisely a general eulogy of the present situation in American collegiate life. He says:

"For my *dimitto nunc,* a bright word of cheer might perhaps seem more in order than the occasional touch of flippancy which my presentation of this saddening subject has indulged in. It will be readily supplied by the rampant optimism of the profession. I have to confess myself so unacclimated to the educational topsy-turvy that I have to laugh at it now and then to stop myself from weeping. And I will not even close with an orison for better things, for I should be praying to gods that are no more, than which earth holds no sharper exile. I am too near the end of my career to be swayed in my viewpoints by personal hopes and fears. Moreover, I know that to most of my colleagues the change of which I complain looks like honest-to-goodness progress. The American college has passed through several distinct stages of control. At first it was governed by the church. Later by the president and the trustees. Faculty control, as the next natural step, was reached by but few institutions. The present trend is very rapid toward government by the community and the students. In the immediate future, success in the professorial career must hinge on an ability to please the students and the town. There is no collective disposition among the advocates of education to pull against the mock-educational tendency of the times. I have stated things as I see them and have no remedy to offer. Only this curious question: Shall some tidal wave of culture return the college professor soon or late to his former honorific

place in society? Or is the demobilization of the professor a premonitory phase of the disarmament of old moral and intellectual world forces?"

When the colleges of America are run, not by a corps of able leaders who have clearly defined ideals of education and are possessed of the will and power to enforce them, but by the students and the villagers in the neighborhood, there is at least a certain high tone and spirit of culture which I believe we older fellows can say, without egotism, that we miss when we go back for reminiscence, and in hopes of spiritual renewal, to the old college campus. We are accused by the younger fellows of being old fogy and out of tune; perhaps we are. But, even if so, it hardly presages well for future American leadership and the hope of passing it on to genuinely educated men, when even the educator cannot run his own institution and is dominated by the local banker, manufacturers, the man in the street, the students and the people of the town.

However, I still possess, perhaps, some of what Dean Heller calls "rampant optimism." Just as we have learned that one "cannot indict a whole people," so one cannot indict a whole system of education. There are too many grand, new and hopeful things going on in American education to require any particularly rampant optimism in order to have a great deal of faith in them.

THE FOUR NEW GOALS OF EDUCATION

Experimental education is going forward with such significant achievement, and is in the hands of so many brilliant and qualified men, that I am prone to believe that just here lie the chief hopes of our country's future. I am sure that here lie also our chief hopes of

eugenics, for I believe that education, both in America and Europe, is marching steadily forward towards four significant goals.

The first of the new goals of education is the measurement of the mind. This has given educators, for the first time in the world's history, a true knowledge of what it is they are trying to educate. Of course, this means the measurement of all kinds of individual differences in intellect, temperament and character. It is a temptation to expand this point into another volume. I hope to do so within the next year or two, because I hardly believe the general public and particularly our industrial managers fully appreciate that the measurement of individual differences can be made into one of the most powerful instruments we have—possibly the most powerful—for making men happy and effective. It is interesting to note in this connection that apparently the first recognition in education of the fact that persons are not all equal occurred in the inaugural address of President Charles W. Eliot, of Harvard College, on October 19, 1869. This famous address was entitled *Educational Reform,* and it marked the beginning of a new era in American education. We owe the existence of true universities, fostering distinctive and advanced learning and research, to President Eliot far more than to any other one man. The following from this inaugural address was called to my attention by Dr. Frank P. Graves, Commissioner of Education of the State of New York. Dr. Graves believes it is the first definite statement of the problem of individual differences and their significance in education. President Eliot said:

"In education, the individual traits of different minds have not been sufficiently attended to.

"When the revelation of his own peculiar taste and capacity comes to a young man, let him reverently give

it welcome, thank God, and take courage. Thereafter he knows his way to happy, enthusiastic work, and God willing, to usefulness and success. The civilization of a people may be inferred from the variety of its tools. There are thousands of years between the stone hatchet and the machine shop. As tools multiply, each is more ingeniously adapted to its own exclusive purpose. So with the men that make the state. For the individual, concentration and the highest development of his own peculiar faculty is the only prudence. But for the state, it is variety, not uniformity, of intellectual product, which is needful.

"These principles are the justification of the system of elective studies which has been gradually developed in this college during the past forty years."

The second goal towards which education is advancing, is, I think, the measurement of educational progress, so that we can tell, as never before, just how much or how little educated a man really is. The field of educational measurements also deserves a volume of popular description, in order that the public may judge whether a man is educated or whether he is not. At least, educational measurements bear rich promise of enabling an institution to certify with much greater accuracy how much education a man has and how effectively he can use it. They also are giving educators a new set of instruments for measuring both the validity and the reliability of their own work. They also furnish a new basis for certifying to the public and to the supporters of education the actual educational power and worth of an institution such as a public school, a college or a university.

The third goal towards which experimental education is traveling is the adjustment of men and women in industry, and in economic and political life. Perhaps more unhappiness comes to human beings from finding

themselves subjected for life to the wrong occupation, the wrong kind of work, than from any other single cause. On this point I shall simply quote the remark made to me recently by Dr. David A. Mitchell, Chairman of the Division of Clinical Psychology of the American Association for the Advancement of Science. He said: "If a man comes to me or to any other psychologist who is thoroughly trained in this field, and he does not know either what he can do best or what he would like best to do, if we can have him for several hours, sometimes covering a period of a few weeks, at the end of that time we can tell him what he can do best and the thing that he would like best to do. Some of my psychological friends may believe this is claiming too much, but I feel that modern psychology has advanced to the point where it can safely set forth this claim to the general public."

The fourth goal of education, is, as I see it, the measurement and education of moral character. Education has nearly all been devoted to the training of the intellect. Of course, as Aristotle and the Greeks looked at education, its object was to train men for the "good life." And the good life to the Greeks did not connote, as it has to both the Protestant and the Catholic in modern centuries, a life whose values were to be determined and measured by their agreement with preconceived creeds and dogmas. To all religious denominations, goodness means conformity to standards of goodness which have been set up by other men or, perchance, by divine revelation. But the good life to the Greek meant nothing of the sort. It meant a brave and clear-eyed facing of life and its problems, with the intelligence and judgment of each man as the final measure of right and wrong. It meant the use of the trained intelligence and the seasoned judgment to determine what was good and worthy and what was

bad and unworthy. It meant that each man was in his own right a unique and wonderful individual, capable of determining the values and the meanings of his own life.

I have considerable hopes that scientific character education in our American colleges is trending towards this noble ideal. Extensive experiments are going on in this field of education, particularly at Columbia University under Dr. Mark May and his colleagues, and at Iowa University under Prof. Edwin D. Starbuck.

Indeed Professor Starbuck was chairman of what is now known as the "Iowa Plan of Character Education" which was awarded in 1922 a prize of $20,000 by a private donor who offered this award for the best plan for character education. This plan is being made the basis of researches in character building now being carried on at Iowa University and other institutions. The training of moral character by the exact and exacting methods of educational psychology is the most hopeful thing in present-day education of which I know. It is bound to mean an overhauling of all our so-called moral and character standards. It is also bound to mean new methods in objectives in our so-called great moral agencies. One investigation, the results of which are not yet published, and which I am not privileged to divulge fully, seems to indicate that the moral influence of the Sunday school, for example, is almost absolutely nil. This investigation also indicates that the moral influence of the church is so slight that it can scarcely be measured by any instruments yet invented. It indicates that the moral influence of the home is many, many times greater than all other agencies combined. I am only privileged to say that these things are indicated. I do not say they are proved. But they are so strongly indicated that they

can but strengthen the suspicion that the Sunday school and the church, which are commonly referred to as "the moral influences of the country," are not leading the minds of men towards any dynamic moral liberty or any sound religious development. Liberty—the absolute moral liberty of the individual—is the most precious hope of civilization. Certainly, the church to-day is not the custodian of this ideal. It never will be, as long as it is under the guidance of men of less than first-class ability.

WE ARE MANAGED BY SECOND-CLASS MEN

I have already pointed out repeatedly the type and class of men who have led the nation into the immense project of prohibition. Some first-class men may be followers of this fantastic experiment, but I doubt that a single one has numbered among its originators and professional propagandists. As another example, What is the real intellectual caliber of the men who are leading the Fundamentalist movement of our time? Mr. Bryan has passed into history, and we shall let his intellectual qualifications be judged by history. But such men as John Roach Straton and the Rev. William Riley and other leaders of Fundamentalism, and also, E. Y. Clarke, "Grand Sovereign of the Supreme Kingdom," and one of the organizers of the Ku Klux Klan, give forth utterances in the newspapers—which indicate—at least if correctly quoted—that these men are apparently of about the intellectual level of ordinary, unselected school boys. Not a single one of them seems ever to have made an intellectual achievement of scholarly rank and cultural distinction; not a single one seems ever to have given evidence that he either understands the modern biological and psychological sciences or that he is capable of doing so. Yet these

men are among the authenticated leaders of two of the most powerful and destructive movements of our time. If the newspaper report printed below, which I clipped from a recent paper, be a correct transcript of utterances of Messrs. Straton and Clarke, I leave the reader of this volume to contemplate the situation of a civilization when men of this apparently low-grade intelligence and destructive temperament gain such enormous power. Following is the report referred to:

JOHN ROACH STRATON TOLD HE'S NOT LIKELY TO GO TO HEAVEN WHEN HE DIES

HIS ASSERTIONS ON EVOLUTION THROW ATLANTA MEETING INTO UPROAR

Atlanta, (A. P.)—An address on "Man or Monkey, Which?" delivered here by Dr. John Roach Straton, pastor of the Calvary Baptist Church of New York City, was brought to a tumultuous close last night when Dr. Witherspoon Dodge, pastor of the Central Congregational Church of Atlanta, sought to question the speaker on the accuracy of his interpretation of evolution.

After a few heated questions and answers had been exchanged, Doctor Straton shouted: "I know what I am. You don't know what you are. And I know too that any man who believes in evolution won't be saved. I know I will go to heaven."

"I doubt it," flung back Doctor Dodge, his face red with anger, as he was shouted down by the audience.

Announcement was made of a national convention to be held at St. Louis next March of the Supreme Kingdom, a fraternal organization, formed here several months ago, for the avowed purpose of combating the teaching of evolution.

In announcing the convention, its Sovereign, E. Y. Clarke of Atlanta, who also organized the Ku Klux Klan, sounded the watchword of the Supreme Kingdom "to wage an aggressive warfare against every doctrine and every theory which seeks to rob God of His supreme majesty as Creator and reflect on man as His highest creation.

"With this purpose in view," he said, "we shall attempt to remove every teacher and every book which teaches evolution or atheism from our schools."

I have brought forward all these considerations with reference to leadership to remind the reader again of the arguments which I have assembled in the previous pages to show that civilization is chiefly what its leaders make it. But our situation is peculiar. Our civilization, from the Renaissance onward, has been created in the main by supreme men. But in our time the largest and most complex social order that the world has ever seen has fallen chiefly into the hands of low-grade and mediocre intelligence for its practical management. The supreme geniuses who create things have invented those devices of printing and cheap communication which have put into the hands of these low-grade men a power of propaganda never dreamed of before. I cannot here go extensively into this phenomenon, but it is probable that the power of propaganda which science has placed in the hands of second-rate men is the most fundamental danger which confronts civilized men. My own point here, however, is that any program of eugenics or race improvement is too intricate, too subtle, too delicate, and requires too much scientific knowledge, to be led by any except the first-class men of the race.

BIOLOGICAL MEANING OF LEADERS

My chief point of interest in this whole problem of leadership and the application of science to government, as implied in Mr. Ireland's Institute for the Study of Government, is at the moment that eugenics and the social engineering of which it is to be the outcome can never succeed except under first-class men, who are the only ones who can give us first-class government. When civilization permits men of second grade to play the leading rôle in social affairs, it simply means that that type of man is the kind the community admires. Consequently, he is the kind who is going to survive and people the nation. He becomes a hero to the youth of the land. They wish to be like him. The ideals he stands for become the ideals of the community. The things which seem valuable to him and worth striving for, which are usually money and political power, become the values most sought after by the body of the citizens. The way in which he builds his house, the way in which he furnishes it, the books he reads (provided he reads any at all), the manners he cultivates, the kind of social affairs he gives in his home, the very speech he utters, which is usually an uncouth *patois,* become the artistic, social, moral, linguistic and cultural ideals of his fellow-citizens. His moral problems, which he cannot solve himself, he enacts into law, and thus he seeks to impose the solution of his own dilemmas upon everybody. Obeying or disobeying these laws becomes the criterion in the community of what constitutes goodness and badness. Unless another comes up to his ideas of the good life, the offender is promptly fined or jailed or even hanged. His aim is not to enact laws to give men more liberty, but to take it away from them. He loudly proclaims liberty as his motto, and

eulogizes it upon every occasion; but liberty is the one thing which second-class men are always afraid of, and the one thing which they teach their followers to be afraid of. This is because they do not know how to use liberty. They imagine it means license. It usually does to a second-class man. But to a first-class man it means only opportunity for moral development and the truly good life.

Men will attain the good life and build a good civilization, and see the necessity for setting up the kind of life that will give survival value to superiority—that is, will encourage superior people to produce more children than inferior people do—only when they themselves learn to reverence superiority, and give their most superior men and women social and political power. Consequently, the problem of high social, economic, educational, religious and political leadership is one of the first concerns of eugenics. But our youth have become so accustomed to second-class leadership that they hold leadership itself in contempt. The idea of giving leadership to superior men strikes them as positively comical. In proof of this, let me cite my friend Mr. Montaville Flowers, the publicist, who recently made careful inquiries of twenty-five thousand high-school students as to their future life plans. He inquired of each group if any-one of them intended to become a preacher or a politician. In the old Greek and Roman days of virtue—when virtue meant more than mere sex conformity, which is what the word chiefly connotes now—a politician was their most "virtuous" and most honored man. He ranked with the artist and the philosopher, at least. But it hardly augurs well for our future leadership in either politics or religion when Mr. Flowers found his question, whether any one of these twenty-five thousand high-school students

proposed to become a preacher or a politician, greeted with a loud guffaw.

Let the reader, however, not forget that my chief interest is in the biological effects which the fear and distrust of superiority and the worship of mediocrity are likely to work upon the race. For if men admire second-rate intelligence and spirit and give inferior men survival value, just as sure as fate they will breed their sons and daughters towards that type of intelligence and character. A civilization which worships mediocrity will breed the race downward towards that biological level of its own mediocrity. If I may venture to repeat what I said in my *New Decalogue of Science,* men will breed biologically towards the man they are looking at.

LEADERS OF THE EUGENICS MOVEMENT

When it comes to such a movement as eugenics, it is fortunate that it has been organized and is so far being directed by very able men. They are organizing and leading the eugenics movement in America, England, France, Germany, Sweden, Norway and other countries. The Eugenics Society of America has been founded by excellent scientific men, and so long as they remain in control the eugenics movement will be safe and sane.

The President of the American Society is Prof. Roswell H. Johnson, of the University of Pittsburgh, co-author with Dr. Popenoe of *Applied Eugenics.* The Vice-President is Charles B. Davenport, of the Carnegie Institution, and the Secretary and Treasurer is Dr. Henry Pratt Fairchild of the University of New York, expert on immigration. The other members of the Board of Directors are Dr. Henry E. Crampton, eminent biologist, of Columbia University; Irving

Fisher, distinguished economist, of Yale University; Madison Grant, an eminent student of anthropology; Dr. Harry H. Laughlin, Director of the Eugenics Record Office of the Carnegie Institution; Dr. Clarence C. Little, President of the University of Michigan; and Harry Olson, Chief Justice of the Municipal Court of Chicago, expert in criminology. Mr. Leon F. Whitney, joint author, with Professor Ellsworth Huntington of Yale University, of a penetrating and original study of our biological origins and assets, entitled *Builders of America,* is the Field and Financial Secretary of the Eugenics Society. The headquarters of this society are at 185 Church Street, New Haven, Connecticut. I think everyone who would send to this address for a pamphlet entitled *A Catechism of Eugenics* would find it very helpful in understanding eugenics. This Catechism has been prepared by a large committee of scientific men and will be sent free of charge. It states succinctly and clearly the aims of eugenics and the methods by which it is hoped to make eugenics the next great social and educational program of the human race.

Since the Eugenics Society of America is working out a great many plans to make eugenics a practical program, and because there are two or three excellent books such as Popenoe and Johnson's *Applied Eugenics* and Prof. Michael Guyer's large, new, standard textbook of eugenics entitled *Being Well-Born,* I have not gone extensively into the practical methods of eugenics in this volume.

I might mention, however, that it is hoped to make it, in time, a requirement of graduation from our colleges and ultimately even from our high schools, that every student shall have worked up and charted out in a technical manner the pedigree of his own family, its achievements, health, longevity, mental and

temperamental characteristics. It is believed that in this way the pedigrees of practically all of the families in America will be a matter of exact record within a comparatively short time. Unless we know the facts about the human herd, how it reproduces itself, and whom it is reproducing, it seems pretty hopeless to attempt either legislation or the regulation of social life in those directions which will, in the first place, prevent race deterioration, and, in the second place, bring about race improvement.

A BRIEF REVIEW

Looking back again over the preceding pages, the reader will, I trust, also recall that in the second section I pointed out that man has four great agencies of race improvement which biology has discovered, and which I showed are in some measure subject to manipulation by human intelligence. These agencies are, first, the inheritance of mental and physical characteristics through the same mechanism, namely, the fertilized egg; second, the correlation of good traits within man's constitutional make-up, which insures us that if we can improve man in any one significant trait this improvement will pull him up in some degree in practically all of his useful characteristics; third, that characteristics acquired by the parents, especially such habits as result from education, are not in themselves strongly transmitted from parent to child, which insures us that if we could in any way improve the race this improvement would not be readily broken down; and, fourth, the fact that like tends to select like in marriage and in this way good qualities are intensified and handed on as permanent possessions of the race.

We also noted that there are some exceptions to the rule that good traits are always correlated, as we

saw that some traits which set men off in types, such as the dominant or reflective or analytical types, are not correlated with each other; and we saw that this is an aid instead of a drawback to both social and biological evolution.

We next noted how man has multiplied and replenished the earth, and sketched the laws which govern the growth of populations. And, last, we described the tendency for cones of leadership to be thrown up within the mass of the population, by which the race becomes more and more fruitful in the production of genius. We also pointed out considerable evidence to indicate that it is this biological truth which is probably the largest single factor in creating the thing we call civilization.

The reader may at times have become wearied because in my discussion of these matters I have wandered (at least as it may have seemed to him) far afield and have discussed problems of government, education, public health, leadership and social life. But the aim of this book has been to discuss in an entirely nontechnical way some of the simpler aspects of eugenics. And, to do so, I have touched purposely upon a number of the social forces at work in national life, just to show that they all bear very directly upon the biological constitution of the race. It is man's environment, the character of his leadership, the kind of government he has, the sort of social and religious ideals which his leaders give him and which develop out of his folk-lore, the kind of education he gets—above all, the way he makes his living and the economic conditions that surround him; it is these which improve him biologically or deteriorate him. They improve him if they are eugenical, and deteriorate him if they are dysgenical. I have also discussed these social forces, in order to show that eugenics is a social and

environmental problem or set of problems just as much as it is a problem of pure biology and heredity. I have been truly distressed within the past year to learn the point of view which a number of reputable biologists and psychologists hold toward what might now be pretty definitely called the eugenics movement.

As an example of that attitude, a number of professional biologists and psychologists have recently expressed themselves to me with almost identically the same remark: "I don't as yet go very strong on eugenics, because I believe a good deal in environment." As though the eugenists were not themselves proclaiming this as loudly as possible! Eugenics is essentially an effort to direct environment so that superiority will survive. It is also a faith that this can be done. Eugenics is a belief that some families, some strains of the human herd, are better than others; and it is the desire of its advocates to bring about those economic and social conditions which will both permit and encourage these strains to carry on permanently a somewhat higher net birth-force than those of less social worth. What could be more sensible? Even if eugenics never did any good to man's natural health and capacity, I cannot conceive of a nobler moral and religious ideal that could animate our social and civic life.

THE VALUE OF A DIFFERENTIAL BIRTH RATE

If all men and women had the same sized families and the same number of children who lived to maturity, and then in turn these children had the same number of children for each married couple, it is probable that the human race would neither progress nor regress. But if, as we saw in discussing race suicide, some married couples reared more children to maturity than others, the race would tend more and more to be made

up of that type of individuals who had the most children. If this type that had the most children were the most intelligent and socially worthy, the race would all the time be tending to become abler mentally and more capable socially. But, as Pearl showed in discussing the Algerian population situation, as men secure more and more of the wealth and other rewards of improved social life, the numbers of their children automatically decrease. The growth of population slows down more rapidly among those sections which bring about social development and create wealth than among those of less creative capacity. Prof. Karl Pearson showed years ago that one-fourth of each generation gives birth to one-half of the next; in the next generation this super-fertile one-half gives birth to seventy-eight per cent. of the following generation; and in turn this seventy-eight per cent. produces ninety-eight per cent. or practically all of the third generation. In other words, there exists now somewhere in the American people one-fourth of its members who will be the great-great-grandparents of practically all the American people within one hundred or one hundred and twenty-five years from to-day. There could, therefore, be no question of greater moment, it would seem on the surface at least, than the question whether this super-fertile one-fourth, whose great-great-grandchildren will in reality constitute the American people, comes chiefly from the more able or the less able, from the more healthy or less healthy, from the more moral or less moral sections of the nation. If this super-fertile one-fourth of our population is composed mainly of skilled working men, successful farmers, traders, merchants, lawyers, clergymen, teachers, dentists, professors, physicians, scientists and spirited and energetic citizens generally then eugenics has little more to ask. True, there would still remain a large

eugenical program to be carried out; but it would be mainly the encouragement of this process already working so beneficially.

RISING TIDE OF BIOLOGICAL CAPACITY

If this be what is taking place, then civilization is, after all, by its own agencies creating a rising tide of social and biological capacity. And I am frank to confess that the conviction is growing in my mind that this is precisely what we are going to discover after all the elements of the situation shall be thought out and the numerous extremely obscure factors brought to light. There are so many unknown factors in the population and in eugenical problems that a eugenist whose mind is not constantly open to quite marked changes of conviction, and who is not constantly seeking for new light upon the enormously technical and involved agencies and counter agencies which work for the growth and decay of peoples, cannot be of much service. In speaking in November, 1926, before the Graduate School of Iowa University, I advanced the thesis that, while there may be increasing degeneracy going on and an increasing number of social incompetents which eugenics must somehow find methods for decreasing and in time eliminating altogether, yet there are selective agencies at work which are bringing about a rising tide of social and biological power among civilized races.

ECONOMIC DEMAND AND BIOLOGICAL SUPPLY

I did not have the benefit, at that time, of knowing the results of an important research which Dr. Raymond Pearl presented to the American Association for the Advancement of Science in Philadelphia at its meeting in December, 1926. This research is entitled

Differential Fertility and has since been published in the *Quarterly Review of Biology,* Vol. II, No. 1, March, 1927, and will no doubt later appear in book form. I trust that all who are technically interested in eugenics will consult this paper with great care, as it presents some new considerations which are of very great significance to eugenics. Some technicians may not agree entirely with the conclusions which Pearl draws from his data. I cannot find myself at present in agreement with all of his conclusions, but they are no doubt of the very greatest significance, and I am quite willing to be convinced.

Doctor Pearl seems to advance what might be termed a law of bio-economic supply and demand; that is, if workers in any field of industry are needed, there is a tendency for the birth rate to be high in those sections of the population which supply the need. He adduces very critical evidence to show that the birth rate has been and still is very high in the agricultural, manufacturing and mining classes of the population. The birth rate in other classes of the population, which he designates as professional, clerical, trade, domestic and personal service, transportation and public service, he finds correspondingly low. Indeed, he finds that these classes are not reproducing themselves. If left to themselves and with no counter currents of selection setting in which might in time enable the super-fertile members of these groups to repopulate their own classes—a thing which I shall later argue is already beginning to take place and will soon be accelerated—then these groups will in the course of time reach the point of extinction.

Pearl takes the very optimistic view, however, that if the latter six sections of the population—which are chiefly the "white-collar" sections—do not reproduce themselves, any deficit in their numbers will readily

be filled up by recruits of ample ability and character from the three sections designated as agricultural, manufacturing and mining.

There can be little doubt that throughout American history, and possibly throughout all history, the chance combinations in marriages have furnished a good deal of ability from these proletarian classes. Some doubts have come into my own mind as to whether, in the peculiar kind of machine-made civilization which we have, this will continue to be true. I shall not argue the question here, since I feel that before any offhand objections are raised to the results of Pearl's research they should run the gauntlet of much more technical criticism and profound analysis than I have given them or than, in many ways, I am capable of giving them. Pearl believes that the dying out of our so-called superior strains—that is, those recruited mainly from the college graduate and more successful economic classes—is not a cause for profound alarm. He believes their ranks will be readily recruited from the more fertile classes of farmers, factory workers and miners. Just because we are a mechanical and industrial civilization demanding a large supply of industrial workers and a small supply of foremen, college professors, salesmen, lawyers, and the like, Pearl believes that this is biologically just as it should be. If this be true, then it is true and is extremely encouraging. It does not, however, do away with the fact that we need ten or a hundred times as many able persons everywhere as any economic or social system has ever given us.

A great many propagandists for special causes of human improvement are keenly disappointed if they find that the problem which they are propagandising about has suddenly solved itself or else never existed. I have no such temperamental reaction with reference

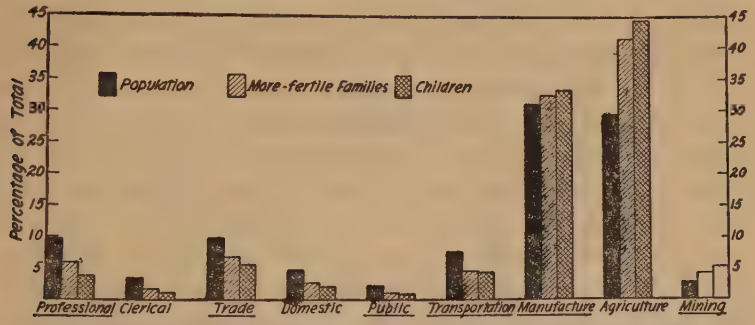
to eugenics. If all is well eugenically and the race is going along healthfully and merrily and cannot be improved, then I am glad of it. As I endeavor to show later on, a good deal of our alarm over the dying out of the more favored and better educated classes is not justified, because some of them are not dying out but are getting ready to increase. My only point here is that I do not feel that Pearl's belief in the high future production of geniuses from the working classes is sufficient warrant for decreasing our efforts to improve the race. If, for example, the college graduate population can be kept at its present high level by recruits from the farms, factories and mines, I think we should rejoice over this fact. I have doubts that it is true, but it is a most comforting fact if it is true.

NO DECREASE IN EUGENIC EFFORT

Granted, however, that Pearl's conclusion that our future leaders must largely come from the farms, factories and mines shall be entirely justified, I do not see any reason for decreasing our efforts to improve the quality of these sections of the population. I rather believe the colleges would be grateful if we could somehow raise the quality of their candidates and increase their number in the population, even though they died out when they got this education, by refusing to reproduce themselves. Eugenics is not dedicated to an effort to breed the human race solely from its intellectuals. In my judgment, physical health, longevity and good moral character, outrank everything else as happy and effective human possessions. If we can induce these qualities in a larger degree in the population, whether it be the "white-collar" or the hard-handed classes, I think eugenics has a happy and an exalting program. But I am certainly glad if Pearl's position be correct that there is

no immediate danger of these qualities declining in the population, and that there is no danger of a decline in the abundance, quality and power of our leaders.

At the very least, it is a great pleasure for me to give the reader the opportunity of seeing set out in clear, graphic form what is now going on in the birth rates of the various classes of our American people. Doctor Pearl has very kindly given me the privilege of reproducing his beautiful diagram, which brings out, more clearly and exactly than has ever been done before, the differences in the fertility of the various



THE DIFFERENTIAL FERTILITY OF THE AMERICAN PEOPLE

Pearl's table of figures are portrayed in the foregoing chart. The figures below show *mathematically* what the chart reveals *graphically;* namely, the fertility of the occupational groups relative to the total population.

Occupational Class	Per cent. in each class in 1920 of males 45 and over a	Per cent. of more fertile families in 1923 b	Per cent. of total children ever born to families in col. b.
Professional service	9.66	5.77	3.75
Clerical occupations	3.33	1.66	1.10
Trade	9.69	6.71	5.36
Domestic and personal service	4.59	2.40	1.97
Public service	2.19	.94	.80
Transportation	7.43	4.44	4.15
Manufacturing and mechanical industries	31.13	32.57	33.37
Agriculture, forestry and animal husbandry	29.39	41.43	44.47
Extraction of minerals	2.59	4.08	5.03
Total	100.00	100.00	100.00

classes. The graph entitled *The Differential Fertility of the American People,* on page 337, together with Pearl's table of figures which the graph is drawn to illustrate and which is appended, will surely leave no doubt in the reader's mind as to what *is taking place.*

Speaking personally to the reader, let me say, you will notice in this graph that the population is divided into nine classes, namely, professional, clerical, trade, domestic and personal service, public service, transportation, manufacturing and mechanical industries, agriculture, and mining. Above each of these classes are three columns, each of which tells a different but biologically connected story. The solid column, at the left of the three, in each case represents the number of men in each occupation who were 45 years of age or over, as reported in the 1920 census. The figures at the right and left of the graph represent percentages. This means that if all the solid columns were placed on top of each other they would run up to 100 per cent. This is true also of the other two columns. Each one adds up to 100 per cent. Consequently, the height of each column above each occupation represents its percentage proportion of the classes to be considered.

For example, the solid column above the word "Professional" runs up almost to 10 per cent.—to be exact, 9.66 per cent. This means that 9.66 per cent. of the men 45 years of age or over in this large sample of the American people are engaged in the professions. The other solid columns, representing the relative number of men 45 years old and over in eight other occupations, run as follows: Clerical, 3.33 per cent.; trade, 9.69; domestic and personal service, 4.59; public service, 2.19; transportation, 7.43; manufacturing, 31.13; agriculture, 29.39; mining, 2.59. This makes a total of 100 per cent. The reader should also scan the table below the graph to get clearly the figures.

Now, the second column is of extraordinary significance. It represents the percentage in each class of these men 45 years of age and over whose wives produced a baby in the year 1923. It is not quite possible to compare 1920 with the year 1923 in all respects, but the difference is of little significance. What Pearl wishes to show is that men of 45 years of age and over who are still producing children, probably form an especially fertile group of men. These he terms his "more fertile" group. Pearl assumes, on the basis of abundant data, that such men also produce more children during their lives than those who do not beget children in the years beyond 45. The proportion of these men in each group is therefore shown in the second column of each occupation. The proportion of such men, for example, in the "Professional group," you will see by the graph, runs a little above 5 per cent. This does not mean 5 per cent. of the column just to the left of it, which you will remember represents the percentage of 45-year-old men and over, in the "Professional" group. It means that of all the super-fertile men in the entire population studied—that is, of all the men whose wives produced a baby in 1923, slightly over 5 per cent. (to be exact, 5.77 per cent.) were "Professional" men. The shares of the other groups, as each column indicates, are as follows: Clerical, 1.66 per cent.; trade, 6.71 per cent.; domestic, 2.40 per cent.; public service, .94 per cent.; transportation, 4.44 per cent.; manufacturing, 32.57 per cent.; agriculture, 41.43 per cent.; mining, 4.08 per cent. The prime thing to notice is that in all the first six groups the second column is shorter than the first column, and in the last three groups the second column is longer than the first one. This gives us the remarkable fact that there was a smaller percentage of these highly fertile men in the first six groups than was the per-

centage of 45-year-old men and over in the whole population; while in the last three groups their percentage of highly fertile men was greater than the share which these groups formed of the total population.

WHERE FUTURE AMERICANS ARE COMING FROM

I hope the reader will see this clearly, because it is of great importance. To appreciate fully what is shown, let the reader contrast the two classes, professional and agricultural. He will notice that the percentage of professional men 45 years and over was nearly 10 per cent. of the total number of such men, while the percentage of highly fertile men of this class was only a little over 5 per cent. of the total number of such men. But in the agricultural group (and also in the manufacturing and mining) the whole picture of family life is reversed. Here the percentage of the agricultural men 45 years of age and over constitutes only about 30 per cent. of the total number of such men, but the percentage of such men who were still producing children constituted over 40 per cent. of the total number of highly fertile men. This important fact sharply distinguishes the last three groups from the first six and shows distinctly from which classes the American people of the future are going to be drawn.

The third column tells the same story with reference to the total number of children which these highly fertile men have ever produced. In the professional group, for example, the third column is shorter than the second and this is true in all the first six groups; but in the last three groups this column is the longest one of all. This means that even the more fertile men in the first six groups have a smaller share of the total number of children produced by such men in the entire

population, and in the last three groups, these men have produced a larger total number of children during their lives than their share, even when competing with the highly fertile members of the first six groups.

Plainly, this whole picture means that the future American people are going to rise mainly from the farmers, factory workers and miners. Whether this is inevitable or not would seem to be the problem which lies before eugenics to ascertain. If it be inevitable we must make the most of it and, it seems to me, concentrate attention upon bettering the conditions, the education and social life, the religious and ethical taboos and ideals which may encourage both better mate selection in these groups, and an improvement in the birth rate of the more richly endowed families in these occupations. As I shall argue later, the most immediate thing is the spread of the knowledge of birth control in these classes in order that they may *automatically improve themselves.*

I should certainly give a good deal personally to know just *who these "more fertile" men are* in all these groups—that is, who are the ones that are now producing more than their share of the children. I should like to know whether they are the men of the better and best ability and character, or the mediocre and the worst. I am strongly inclined to think that they are, on the average, of the sounder, healthier and better sort. If so, I believe the new discoveries in biology discussed later are going to give them a still better chance to reproduce their excellent breeds. Certainly, their superior vitality is well nigh a complete proof of their better mental and physical health and general soundness of constitution. And the evidence I have already submitted, that healthy and long-lived people are, on the average, more intelligent and of better moral character than short-lived and

unhealthy people, leads us to infer that probably it is the most desirable elements everywhere which are recruiting the coming generations to a greater extent, at least, than the less desirable. If so, these are all points in favor of Pearl's position of satisfaction with the present situation. However, my own point of view is that these processes *can all be strengthened by intelligent eugenical effort,* and that it is the duty and privilege of students of eugenics to devise ways and means to aid these beneficent and dependable forces of nature. To do this intelligently will require all the sanity, judgment and scientific training of the economist, the psychologist, the biologist, the educator, the religious teacher, the man of medicine, the welfare worker, the philanthropist and statesman combined. Indeed the improvement of the human race is fraught with so many difficulties, pitfalls, obscurities, intricacies and dangers, that it is the last and most arduous—but at the same time, the highest—challenge to human intelligence and character.

AMERICA FACING A BIOLOGICAL REVOLUTION

H. G. Wells is quoted as saying in a recent dispatch in the *New York Times:* "There is a biological revolution in progress of far profounder moment than any French or Russian revolution that ever happened. The facts come dripping in to us, here a paragraph in the newspaper, there a book, now a chance remark; we are busy about our personal affairs and rarely find time to sit back and consider the immense significance of the whole continuing process . . . . The ways and experiences of our children and our children's children promise to be profoundly different from the life we lead at the present time. We should give a rest to our practical working belief in the security of things as

they are. We should take the rest and refreshment of a few glances at the longer realities."

I agree with Mr. Wells that a biological revolution is in progress, although I doubt that it is either due to the causes or going in the direction that Mr. Wells imagines, as he has not heretofore shown himself profoundly informed upon the deeper biology of population development. But he is certainly right in his opinion that we should take an earnest look at the "longer realities." It is these longer realities with which eugenics must deal. And researches such as Pearl has given us here and which he is pouring from his laboratories come as powerful aids to our minds in seeing just what these long realities are. If Pearl be right that the race is not deteriorating, and we can depend upon natural forces ceaselessly at work to keep it at least stationary, so much the better. It gives eugenics a higher starting point. While some of us have thought that the evidence indicated a rather ominous decay of the best elements of the population, yet race deterioration is *not* a necessity of eugenics, as some have seemed to believe. I hope Pearl is right. I merely voice here some questioning fear that his faith in the continued supply of racial saviors and leaders from our working population may not, as time goes on, be completely fulfilled. But his research gives me renewed hope that civilization is evolving and can be depended upon to evolve a naturally civilized man, capable of sustaining his biological virility amidst the abundant enjoyment of all the values and luxuries of culture. To submit evidence that this is probable and also that eugenics can aid the process is the ultimate objective of this book and the evidence will be presented in the next section.

SECTION SEVEN
THE NEXT AGE OF MAN

VII

WHAT BIRTH CONTROL MEANS TO MANKIND

Practically all of the considerations which have been advanced so far with reference to the laws which govern the reproduction of human beings in general and of the different sections of the population in particular have assumed that we were dealing with natural fertility at its maximum and without any conscious and deliberate birth control. Of course, there are a great many more or less conscious factors which influence marriage rates, birth rates, death rates and the general processes of sexual reproduction. But there is one factor that is always the product of personal forethought on the part of parents. Because of its immense importance, I have so far purposely kept it out of the discussion. This factor is deliberate and conscious determination by the parents of the number of children which they shall produce. It is commonly referred to as birth control.

Intentional and deliberate birth control is so new a thing in the world's history that we must say frankly we do not know in any detail either what it is doing or what it may do in the future to the human race. Consequently, from this point on, this essay is largely speculative. I venture to believe, however, that the speculations are sound and are in the main almost a necessary inference from what we know of the mechanics of heredity, the selective forces at work in the population and the general theory of organic evolution.

At the outset I may state my own belief that voluntary birth control is the overshadowing fact of the modern world. This conviction may be outrunning the data at hand, but I do not feel it does so to any great extent. It is true we are in pressing need of countless investigations in this field, but present-day knowledge, meager as it is, inclines me to believe that direct birth control may be the decisive agent in determining man's earthly destiny and character, and in shaping the future of his civilization.

Let us reflect for just a moment on what birth control actually is, as a fact in organic life. Perhaps I should not have made this suggestion, because, in order to reflect intelligently upon it, one is almost forced to run his mind over the whole range of evolutionary thought. But certain it is that no species of plant or animal ever possessed control over its own reproduction. The plant is forced by its own constitution to load its branches with seeds which at once are scattered far and wide by the birds of the air, the beasts of the field, the currents of water and even the winds of heaven. Each seed must grow where it falls, and fight its own battle in the world-old struggle for existence. The reproduction and carrying on of the species itself is so vastly more important than the life of any one individual that, as Emerson said, "nature has immensely overloaded the sexual passion." For every fish that survives millions have to be born. Tennyson observed that nature is always careless of the individual and careful of the race.

But at last there comes upon the evolutionary stage a being which has not only conquered all the other species of the animal kingdom, but bids fair, in the reproduction of his own species, to conquer nature herself. We can readily see what birth control among plants and animals has meant for their improvement

when carried out by the all-mastering hand of man. It is by no other means than selection and birth control that man has produced the bewildering variety of plants and animals which give him food, add to his comfort and delight his sense of beauty.

All of this birth control, however, has been administered from an outside source. We can only imagine what might have happened if at some stage some animal—the horse, for example—had gained the power to control its own reproduction and knew which members of its species to select for perpetuation. Such an animal might have taken possession of the earth, and never allowed man a chance to rise to sovereign power.

However, man has become possessed of this power, and it remains to be seen whether he has the intelligence to determine who shall survive, any better than the unbridled passions and impulses of his undisciplined nature has always heretofore determined.

TYPES OF BIRTH CONTROL

Now, there are a great many methods which the human race has followed to control reproduction. One method is hanging. Probably our radical birth controllers have not contemplated putting this method into general use, but execution has no doubt played quite a part in determining reproduction and survival. It has probably been far more often applied to persons of character and ability than to criminals, in the sense in which we now use the word criminal. During the one hundred and fifty years of the so-called Reformation the Roman Catholics and Protestants executed each other, especially the leaders, at a merry rate. Some historians have estimated that during the Inquisition at least one hundred thousand Protestants, chiefly of the leading class, were put to death.

War is another effective method of birth control. Notwithstanding all the literature on the biological effects of war, it is still an extremely obscure and unanswered problem. We really do not know whether war kills off the best or the worst or the average. We hear from peace societies that war is deteriorating the breed; but, as a matter of fact, we simply do not know. Beyond question, the introduction of gas warfare has made war vastly more humane and less destructive. The public impression is quite to the contrary, but, as I have already pointed out, the public impression about any matter of fact can be safely "banked upon" as being wrong. Whether war has been a dysgenic or eugenic agency is yet to be discovered.

There have also been, in all ages, all kinds of marriage taboos which have affected the birth rate to some extent. There is just now a powerful taboo in many states and sections against the marriage of first cousins. The public believes very strongly that the marriage of persons near of kin creates defects in the offspring. This is not true. If defects exist they are intensified; if virtues exist they are, likewise, intensified. However, the same results would happen if the same defects and virtues were united by persons who were not related by blood. The blood relationship of itself has no effect one way or the other.

STERILIZATION OF THE UNFIT

Another method which provides one hundred per cent. birth control in the individuals affected, and which is an invention of biology and surgery combined, is sterilization. The public has considerably misunderstood this simple and harmless method of cutting off undesirable strains in the population. The Supreme Court of Iowa not long since declared unconstitutional

the sterilization law passed by the legislature of that State. The grounds of the decision, as reported in the press, were that it enforced "cruel and unusual punishment." While it may be unusual, it is not a punishment nor is it in the slightest degree cruel. It is not nearly so severe a surgical interference as removing tonsils or pulling abscessed teeth. These operations are not regarded in the light of pleasures, but are not regarded as cruelty, even where they are enforced by school boards and other authorities. Sterilization in no way interferes with the physical health and happiness of the individual and should, therefore, be regarded as a mere civil procedure on the part of the State to determine the quality and character of its future citizens. It should be regarded the same as an immigration law or any regulation limiting the introduction of undesirable citizens. A new method for the sterilization of women has recently been devised, by Doctor Dickinson, which is claimed upon good authority to be an even milder procedure than that utilized for the sterilization of men. The whole method and purpose are both humane and merciful, and warrants the support of every thoughtful citizen who wishes to decrease the number of miserable and unhappy people born into the world.

I might add a little information as to the present status of sterilization. It was first effectively undertaken in Indiana, where something over six hundred chronic criminals were sterilized before the law was very foolishly repealed. There are now some twenty-two states which have more or less effective laws on their statute books. The most effective work has been done by California. Prof. Samuel J. Holmes, of the University of California, informs me that about four thousand five hundred persons have received sterilization treatment in that state. I do not have the data

on Michigan for 1926, but during 1925 some forty-five men and women were sterilized in that state. Other states have had more or less successful records.

PERSUASION BETTER THAN LEGISLATION

The encouraging thing about sterilization is that, contrary to public belief, the majority of operations are not performed under duress and legal pressure, but are merely instituted through persuasion of the individuals on the part of tactful physicians and prison officials. Professor Holmes tells me that persuasion has been the most effective method in California for carrying on sterilization. Most criminals are, after all, pretty good fellows. The notion that they are bad all through is merely a romantic fantasy. The notion that they cannot be reasoned with, outside of the few low feeble-minded and insane criminals, is not correct. As one prison official said to me: "Most of these fellows are pretty good chaps, and when we think it best that their type should not be reproduced we have a good, sympathetic talk with them about sterilization. When it has been explained to them that it will not injure their health or happiness, they often say, 'Well, we don't want to get out of here and get drunk and carry on with some woman and have a boy or a girl back here like us in fifteen or twenty years; and, if you say, doc, that it won't hurt us, why, go right ahead.'"

It seems evident from experience to date that a lot of foolish sentimentality has been wasted by those opposed to sterilization. Its opponents have pictured the advocates of eugenics as getting ready to go out and sterilize about one-fourth of the population. No eugenist has ever believed that at present this method could be applied properly and safely to more than the positively feeble-minded and the chronic criminal.

These do not constitute more than two per cent. of the population; and, so far as I am aware, no eugenist has ever advocated the immediate sterilization of more than one per cent., and the most of us have confined our present hopes to perhaps half of one per cent.

We have also heard a great deal of sentimental talk that this method would likely sterilize unwittingly nearly all the parents of the future Lincolns, Faradays, Edisons and the like. This talk comes from persons who are not familiar with the theory of probability on the one hand, or with the present-day methods of mental and personality measurements on the other.

If one takes the actual families of geniuses and the families of feeble-minded and chronic criminals, a little calculation would show, I am sure, that the probability of unknowingly sterilizing the parents of any of our future geniuses or saviors would be about one in several billions. We do not refrain from hanging a man in the belief that he will likely procreate a future prophet or seer if allowed to run loose in the community. Nor do we hesitate to segregate, for life, extreme criminals, feeble-minded and insane persons. Yet when it comes to a much simpler, happier, cheaper and more healthful method of cutting off these criminalistic and anti-social strains, we suddenly find that they have been the chief progenitors of our most worthy citizens and persons of genius!

STERILIZED PERSONS ALLOWED TO MARRY

Another objection to sterilization has been made which deserves thoughtful consideration. I think the failure to meet this objection is a fault of the eugenists themselves. Many kind-hearted persons point out that it is a pity to deprive persons who should be sterilized of the companionship of marriage. I think it is not only a pity but a social danger. Many tubercular

people, diabetics, and the like, will no doubt live years and years longer and become much more happy and effective citizens if they can marry, have a home with its health-giving atmosphere, and the like. The only restrictions that should be imposed upon such persons is that they either submit to sterilization or refrain from producing children. Many of them are of the highest ability and character, and some have been among the world's geniuses.

Many physicians who are not familiar with the laws of heredity will point out to such persons that tuberculosis or diabetes, should either occur in the children, can now be cured. Certainly, and this is a triumph of medical genius. But the grandchildren and great-grandchildren, at least some of them, would likewise have to be cured. Moreover, by continued marriages down the line they would tend to bring more and more afflicted individuals into the world. This is well illustrated by the large amount of tuberculosis among the young people now in Arizona, southern California and other health resorts.

What I have said with reference to diabetes and tuberculosis applies even more strongly to deaf-mutism. As Alexander Graham Bell has shown, some forms of deaf-mutism are inheritable and some are not. Where deafness or deaf-mutism arises from some childhood disease or injury, of course it is not inherited. This is again a beneficent result of the non-heritability of acquired characters. But a large percentage of deafness and deaf-mutism is heritable. Even so, however, it is absurd to prevent these excellent people from the happy and wholesome companionship of married life, provided they will refrain from producing children or submit to sterilization.

This also applies, in my judgment, to feeble-mind-

edness. Feeble-minded people are merely mental children. They become dangerous children, however, if they are not given as normal a life as possible. Marriage is a normal life. Many of them can maintain homes and be quite effective people if properly encouraged and aided by the community. Nothing could be more dangerous, however, than to deny them marriage unless they are confined in institutions. If they are allowed to be at large, what is needed is to persuade them to submit to sterilization. This especially applies to the higher grades of feeble-mindedness, the morons. Many morons are most effective factory workers and enjoy the monotony of tending simple machines or carrying out simple industrial processes. They should, if anything, be encouraged to set up homes and marry each other and carry on a normal life. They become a danger only where they are not given normal life, nor studied and aided by a friendly, understanding sympathy, and allowed to increase their numbers in a brood of children.

While I myself think that persuasion and education are always more effective means of attaining any social object than is legislation, yet, in order to overcome all reasonable objections to sterilization, the law passed some two years ago in Oregon impresses me as providing a way out of the difficulty. In effect, it provides that if the members of a community believe a citizen is bringing or likely to bring extremely undesirable children into the community, he can by various legal means be brought to trial before a jury in order to test the question as to whether he is fit to be an ancestor. The State will provide him with legal and medical counsel, so the humblest citizen has ample means of self-protection. It seems to me that if a man cannot prove to his fellow citizens, when his case is carefully considered by a jury of his peers—the good, average

citizens of his community—that he should contribute his blood and character to the life about him, it is a perfectly fair and just conclusion that he be deprived, by this merciful means of science, of this social and biological privilege.

EFFECTS OF RELIGION ON BIRTH RATES

All kinds of religious decrees and beliefs have likewise been direct or indirect methods of birth control. The Roman Catholic Church, for example, compels its clergy, nuns and sisterhood to remain celibate; although, I understand, under special circumstances these rules are abated in the case of the sisterhoods. While I am not familiar with Roman Catholic law or theology, I believe we are given every evidence in the public prints that the Roman Catholic Church preaches very strongly against birth control among its laity. I have no criticism whatsoever to make of the Roman Catholic religion or theology; as, to my mind, the merits of a religious system are chiefly determined by its effect in teaching people right relationships and attitudes toward one another. How to live in this world happily and effectively is, I think, going to be more and more the chief objective of religion. However that may be, speaking purely from the standpoint of biology, I do not see how the Roman Catholic Church could have devised more ingenious methods for bringing about its own downfall and loss of power than the biological course which it has taken—provided I am correctly informed that it strongly urges its adherents as a matter of religious duty to refrain from birth regulation. In the first place, this process effectively cuts off its leaders at the top and increases the numbers who need leadership at the bottom. It also destroys all possibility of building up those powerful

cones of ability which we have seen have been such effective agencies in the control of civilization. It is probably not so far-fetched a conception that this very policy may have been the thing which caused the loss of the temporal power of the Catholic Church at the close of the Middle Ages. It would be at least as good a guess as are the numerous fanciful theories which many historians have set out, with dogmatic certainty, as to what brought about this remarkable historical phenomenon.

It is a matter worthy of note that the Catholic colony of Maryland provided religious freedom prior to the Protestant colony of Massachusetts which was founded for the avowed purpose of religious liberty. Freedom for both Catholics and Protestants was guaranteed by the Maryland charter. With so many things to the credit of the Roman Catholic Church in the development of intellectual liberty, it may not be too much for a humble student of science to hope that in time the Catholic rulers will bring about changes in this untoward biological situation, which I cannot but believe is continually depriving the race of a considerable amount of ability and social capacity of a very high order.

In the days that lie ahead, confronted as we are with what Prof. William McDougall aptly calls "the structural overloading of civilization," we are going to need every ounce of leadership that the race can summon. And, with an entire lack of any attitude of personal criticism, a student of eugenics is bound to hope that the leaders of the Catholic world may reconsider, in the light of the new knowledge which biology has brought to us, this very large problem in their own future. At least, I am sure that the Catholic Church will be forced to reckon with the very powerful agencies of both racial and social change which, as I shall

point out in the next few pages, biology is about to let loose upon the world. I believe that the biologists are about to turn loose from their laboratories forces which, while less spectacular, will be in reality more powerful engines in shaping man's earthly future and determining his inborn happiness and capacity than have been all the inventions of the physicist and the chemist and the electrical engineer. Every social, political, religious and educational agency is bound to be affected by these new inventions of the biologist. For they are inventions, just as much as any that have been devised by Hertz or Faraday or Clerk-Maxwell or Marconi or Edison or the Wrights or Pupin. The only difference is that they will go directly to the roots of human nature and determine, as no single set of agencies has ever determined, what sort of human nature shall survive and, in the future, replenish the earth.

BIOLOGICAL BIRTH CONTROL

In addition to the methods of influencing the human birth rate already noted, most of which are social rather than individual, there have been in all ages great efforts made by which the individual might control sexual reproduction. Until science attacked the problem within the past half century, most of these methods have been extremely harmful and have caused untold ill health and misery, especially among womankind. The effort to lift from the life of woman the burden of Eve has gone on, usually with tragic results, all through the ages. Within the past half century, medical science, chemistry and mechanics have all combined their efforts to solve this world-old problem. These efforts have been fairly successful. During the past generation, fairly healthful methods of birth regulation have been devised. It is wholly unnecessary to

discuss them here. The point is that they have all been chiefly mechanical or chemical.

Owing to the facts cited in the foregoing paragraph, all methods of birth control up to the present time have involved quite elaborate technique which has necessitated the use of considerable intelligence and no small degree of personal character, forethought and self-control. Just for this very reason it has been only the intelligent by whom birth control has been utilized. It is difficult to conceive of a more ingenious device for eliminating the intelligence of the community than this. It is precisely the same situation which would obtain if a farmer should spread a knowledge of birth control among his best animals and induce them by every possible means to make use of it, and should withhold this knowledge from the worst specimens of his breeds. It is obvious that his herds would rapidly deteriorate.

Now let us consider this situation among human beings. Science has devised technical methods by which those endowed with intelligence and judgment can prevent the reproduction of their intelligence and judgment in a brood of children. At the same time these inventions have required so much intelligence, judgment and character that those who do not possess these natural endowments, quite naturally cannot thus limit their offspring. While as Pearl has shown, the pressure of population, the general increase of wealth, the improvement in the well-being of even the poorest sections of the community, lead to a natural decline in the birth rate of all classes, yet conscious birth regulation has been limited to the more intelligent strata of society. I use the word strata with intention, since society is pretty clearly a stratified affair. And it is the more richly endowed strata that have artificially reduced the numbers of their children. In other

words, biological capacity by this process tends not to be reproduced, while biological incapacity continues to replenish the population. A mere reduction in the birth rate in order that the children who are born may have the benefit of wealth and culture is not only not a calamity but it is the only way in which wealth and comfort can be very widely distributed. The large families of Colonial days, which indeed continued with very little diminution down to a half century ago, are a sheer physical impossibility now, if the children are to partake of the multitudinous benefits which our increased well-being has provided.

Unfortunately, therefore, birth control so far has tended steadily to eliminate those with the greatest forethought and judgment and to leave in control of the biological field those of lesser character and intelligence. As if this natural process were not enough and did not reduce our national intelligence and character fast enough, our social and moral regulators have sought by stringent legislation to prevent all knowledge of birth control being given to anyone by our physicians and scientific men. For example, if I should mention at this point any method of birth regulation, I should be promptly and unceremoniously jailed as a common criminal.

Our morality improvers and the saviors-of-society-by-legislation, had they possessed the necessary wit, would have seen that, despite their legislation, the shrewd and intelligent, the thoughtful and far-seeing would get what they wanted anyhow; while lesser endowed folks would not have the power, influence and ingenuity to secure this knowledge. The results have been precisely the same as those which have accompanied prohibition. The same disastrous results follow all prohibitory social legislation.

The effects, therefore, of birth control have up to

the present time tended in the wrong direction, to say the least. However, I think the hour has come when this situation is going to be changed radically. And I think that it is going to be beyond the will and the wit of man to stop what in my belief is about to happen to mankind. I may be sadly mistaken, as I often am, but it is impossible for me not to believe that the biologists are about to precipitate a crisis in the world's history. This is due to discoveries in the biology of reproduction of which this volume is the first general public announcement.

The history of this epoch-making discovery is, roughly, as follows: Eleven years ago a group of biologists began the study, by entirely new technical methods, of the processes of reproduction, especially in mammals such as rabbits and guinea pigs. Reproduction is a purely biological process, and it is perfectly natural that the control of reproduction should come within the biological field instead of, as heretofore, in the field of the surgeon, the mechanician and the chemist. Up to a decade ago, however, very little was known of the reproductive processes of animals, particularly as to why the reproductive period should gradually rise, come to a crisis, and then rather suddenly subside.

It is these intricate, obscure and at the same time fascinating problems of the reproductive mechanism that have engaged the attention of a group of embryologists and biochemists for a number of years, with progressively satisfying results. Practically all of this work has been done in American laboratories. It has led to the development of a whole new field of science in which the discoveries have been as fascinating and romantic as in the fields of chemistry and physics. The latter seem, of course, more romantic to the general public because they lead to such things

as radio, electric light and airplanes. These are things that a common man can use, even though he has no idea of the long train of intellectual achievements of which these inventions are the spectacular result.

But this field of biochemistry concerned with reproduction is about to yield intellectual triumphs, which I think will influence the future lives and characters of men as much as or more than all the other discoveries of science combined. I say this because I am privileged to announce here for the first time to the general public that these obscure and unknown biologists have achieved an understanding of the reproductive processes in the higher animals and in man sufficient to warrant us in believing that the complete control of reproduction will very shortly be placed in human hands.

The net result of this long series of painstaking investigations has been the discovery that reproduction is in the main under control of two hormones. Hormones, the reader will doubtless recall, are tiny chemical messengers, first described by Starling, an English scientist, some twenty or more years ago. These hormones travel in the blood and lymph streams of the body, and cause significant reactions to take place as the result of their presence. These biochemists find, to put it roughly, that there is one hormone in the female which brings about the periodic process known as ovulation—that is, the production of the ovum or egg. There is also a second hormone which subsequently brings this process of ovulation to an end and for a time suspends this group of reactions. Now, it occurred to these workers that if these hormones could be isolated, they could be used at the will of the experimenter either to set going the processes of reproduction or to suspend them entirely.

Since the exact statement of such a piece of

scientific work—one which I believe is fraught with immense consequences to human beings—is extremely important, I have been privileged to elaborate a statement of the matter with one of the leading workers in this field. The composition of this statement is mainly his, and it has received his full approval and that of his colleagues. It is as follows:

"This new field of biological investigation is chiefly based on the exact study of ovarian biochemistry and an analysis of those mysterious chemical factors, the so-called hormones, which are elaborated in some of the glands of our body and which exert a powerful and specific effect upon our physiological functions and upon our own psychology. The analysis and study of these very specific glandular secretions is one of the most charming and promising chapters of modern biology and biochemistry.

"Let us take as an example the ovarian gland. It usually secretes a very useful chemical agent which stimulates specifically the growth, development and proper functioning of the uterus and the whole female genital tract. This is the so-called female sex hormone or follicular hormone. Without it the female sexual function would be entirely impossible.

"But this does not constitute the only specific factor secreted by the ovarian gland. It has been discovered that at certain specific periods a new agent is necessary and promptly comes into play, a regulatory agent which gives that surprising clock-like precision and rhythm to the female functions. It is a suppressive agent; it counteracts, antagonizes and stops all that wonderful and precise ovarian and menstrual activity and rhythm.

"Very exact and minute experiments with animals have shown that this second hormone, the so-called 'luteal' hormone, if given in small hypodermic injec-

tions from time to time can stop the whole ovarian and female mechanism and bring it to a complete standstill. Under the effect of this injection, the egg production is entirely suppressed in the ovary and reappears in regular order sometime after the discontinuance of the treatment.

"These facts have been brought out within recent years by very exact analytical work done in this country with the most modern methods. Allen and Doisy have analyzed and described the effect of the first secretion designated above as the female sex hormone; and the inhibitive, suppressing effect of the second secretion, designated as the luteal hormone, has been very recently announced by Dr. George N. Papanicolaou of the Cornell Medical School, in the *Journal of the American Medical Association.*

"To those who are well informed at the present time about these two counteracting factors which regulate the whole female sexual mechanism, it seems to be only a matter of time when these specific chemical bodies, that is, the female sex hormone and the luteal hormone, will both be fully available for a more extensive experimentation and study, particularly in our own human species. A few minor details have yet to be worked out. This is already being done by a large number of chemists, who are trying further to isolate and purify these bodies and to obtain them in a proper solvent. When this is done a new human biological field will have been established. The control of the complex female function and the possibility of stimulating or suppressing at will the egg production may revolutionize to a certain extent our social foundations; indeed it may easily be that the establishment of a sound and healthful biological control of the reproductive functions and mechanisms may be the precursor of a new age of man."

BIRTH CONTROL SOON TO BE UNIVERSAL

I might go further in explanation of the foregoing technical facts and explain that at present the hormones have proved soluble only in solutions of oil. This presents some slight disadvantages in their administration, which is at present accomplished in the main by hypodermic injections. A number of chemists are working on the problem of securing their isolation and dissolution in water. If this can be accomplished, of which there can be little doubt, it will make their administration much simpler. It even presents the very reasonable probability that they may be reduced to some such form as tablets or some other type easy of administration. This is doubtless some years ahead, although it is quite possible that it will be only a very few years. It seems reasonable to believe that even less than a decade will see a complete triumph in this difficult field of biochemical inquiry.

BIRTH CONTROL PURCHASABLE AT THE NEWS STANDS

The further speculations which I submit to the reader upon the possibilities of universal birth control are entirely my own and not those of the biochemists. Their object is to solve this problem of pure knowledge, and not to discuss social, ethical, religious, economic and political results of the application of their knowledge. But I confess that it rather thrills and terrifies the imagination to contemplate the social and biological outcome of birth regulation, should it, as seems quite possible—indeed, I think well nigh a certainty—become procurable at the drug stores and news stands as we now purchase chewing gum or aspirin. Let us suppose that this racial determiner,

this arbiter of future human life, should become readily and easily obtainable in a simple form, such as capsules or tablets. If perfectly healthful, biological birth control becomes, as I believe it will, a mere matter of women swallowing a few tablets each month, it places an evolutionary engine in human hands of perfectly staggering possibilities for good or ill. There is scarcely any indoor sport which humanity seems to enjoy more than swallowing tablets of both known and unknown composition and effect. Consequently, I think we can count upon the fact that even so highly concentrated an agent of evolutionary determinism will be swallowed by all classes, faiths, races, tongues, colors and previous conditions of either biological freedom or servitude.

If we should add to the foregoing another biological discovery, another evolutionary determinant, which those biologists most competent to judge believe is not far over the horizon—namely, the determination of the sex of the offspring by the parents—it seems to me that man may well tremble at the biological Frankenstein monsters of his own creation. Plainly, it is a crisis in the affairs of human beings. It is probably a great turning point in man's evolutionary history, second only to that far-away time when man—naked, barehanded, and with nothing to guide him except his intelligence—lifted his body erect and started up the long pathway towards the adventures, the tragedies, the pleasures and the disciplines of culture.

WHO SHALL SURVIVE?

If we take a long look into the future and contemplate not merely the to-morrow, but endeavor to see with just as stern realism to-morrow's to-morrow, and then that morrow's to-morrow, we are bound to ask in

a new way, Who shall survive when human intelligence, passion and desire and not merely brute natural selection can determine the kind of human beings who shall and who shall not be born? What sort of beings will they be? What manner of man shall come to people the earth? Will he be better or worse than we are? Will he be wiser, saner, healthier, more beautiful, more social, more civilized than we are? Or, will he be an atavistic product, intellectual but brutal, frail of body, unmoral, selfish and unsocial, retaining only the intelligence to preserve this one instrument which determines the direction of his own evolution?

We know there are men and women in the world who are naturally glorious. They truly seem to be children of the gods. You and I personally know a number of them among our own friends and acquaintances. They are naturally healthy, strong, sane, beautiful and wise; they seem born to be happy and to make the world happy. They are intensely social in all their interests and passions. They throw all their energies into the building up of the community. Without ostentation or blare of trumpets, they are partners and leaders in every community movement that tends towards goodness and beauty and truth. In every emergency people lean upon them, and do not feel afraid behind their leadership. They naturally love music and art and all the great cultural disciplines which men have developed, the disciplines which we call science, philosophy, ethics and the higher things of sociology and politics. They move the world forward and, as Woodrow Wilson said, "increase the world's fitness for affairs."

The opponents of eugenics say we eugenists have no ideals, that we do not know what kind of beings we want men to be. Yes, we do. We want men to be like these glorious people. There is not the slightest diffi-

culty in finding them. They exist all about us. There are just thousands upon thousands of them. They are naturally civilized, and they are the people who have made civilization as civilized as it is.

WHO WILL ASSUME THE BURDENS OF PARENTHOOD?

Now, under universal birth control will people of that sort undertake the burdens of parenthood? Will they be the sort of people who shall survive, or will it be some other sort? Will parenthood be undertaken by the gay and thoughtless as a pleasing social diversion and a bid for publicity, as seems now often to be the case; or will it be undertaken by those too ignorant and stupid to care for the morrow; or will it be chiefly those of rich and abundant natures whose contributions will be of the greatest value both to our racial and national fortunes?

WILL THE PRINCE OR THE PAUPER, THE MAID OR THE MISTRESS, SURVIVE?

The reader may, if he be of a jocose turn of mind, amuse himself by imagining that I am merely turning about the comic facets of some biological joke. However, to the reflective reader, I am proposing what I feel perfectly certain are the stern problems which men must face in the age which is now already diffusing its rays through the dawn. Men must, at least, *ask* these questions; they must likewise seek to aid nature in solving them; for in my belief not only the future character, intelligence and health of their race are at stake, but the future of their social and political institutions as well.

Now, at first glance, it would seem that present-day civilization is nearly all rigged against the survival of

intelligence and virtue. This is because it is a far greater burden for a man of character and cultivation to undertake parenthood than it is for a man who does not have these social and biological possessions and the high ambitions which go with them. By his very nature he desires to give his children a better chance for individual development, more of this world's opportunities, adventures, goods and cultures, than he and the mother of his children themselves had. It is his inborn drives which make him desire these things and make him willing to spend his energies in securing them. The man who is lower in the economic scale—which means, on the average, that he is lower also in the scale of intelligence and character—is by his very make-up lacking in those towering passions, those far-away longings and that divine discontent which lead men to strive to secure both for themselves and for their children a better "coign of vantage" in the social and economic structure.

There can be little doubt that at present these differences between the upper and the lower man have worked in the main dysgenically. This is because the lower man has little or no power to control his birth rate, while the upper man—for the past generation or two, at least—has had this powerful biological as well as social and economic instrument in his possession. Consequently, the lower man has multiplied while the upper man has died out. When, however, both prince and pauper, mistress and maid, moron and genius, alike, can determine who shall undertake parenthood, a totally new biological as well as economic situation is going to confront mankind.

Now, when this situation arrives, as I feel sure it soon will arrive—a situation wholly new in the history of life—it would still seem eugenically unfortunate that the economic scales should be loaded against

those with desirable qualities. But can we be sure that this inference is true? We eugenists have been talking constantly about removing the economic and social pressures against parenthood. But are we altogether wise? It seems to me that precisely the opposite influence is probably just as valid; and, furthermore, I doubt that the economic pressure against desirable parenthood can possibly be removed.

BONUSES FOR BABIES

Let us reflect for a moment upon this point. The parents who have the qualities which we believe are the most desirable for the highest type of social and cultural life are the very ones who not only desire all the benefits of so teeming, luxurious a culture, but they are the very ones who must create all these values of civilization. Should any of these more successful persons—let us say, for example, skilled mechanics or college professors—be situated economically so that they could not rear a good-sized family, it might seem wise to provide for them bonuses from the State or from their employers, or in some way give them out of the public purse the economic freedom for rearing children which they have not been able to win for themselves.

I am inclined to feel that this conclusion should not be too hastily drawn. At least, I believe more thought and investigation should be given to it than it has so far received. It seems worth pointing out that possibly just the opposite conclusion might be safely reached from the premises in hand. It may be, after all, that in a fairly open economic competition, when due allowances are made for personal exceptions, it is the best man who wins. It would seem, at any rate, that on the general average those who could win the values of culture, including wealth, education and social influence,

are the ones best fitted for carrying on these values and best able to create new ones. There are always exceptions to any social or biological generalization which includes so many factors. But I think those exceptions might be dealt with better by devoting specific intelligence to specific cases, than by trying by some blanket bonus of some sort to stem the tide of biological selection. A bonus for babies whose parents had made certain commendable achievements might be advisable, so long as birth control is known, as heretofore, only to the more successful economic and professional classes. But when birth control becomes universally known and, as I believe it will be, well-nigh universally applied, a vast new biological situation is going to develop. It may well be, when birth control becomes universal, that the stronger the social order makes the economic and cultural pressures against parenthood, the higher will be the biological values which survive. Certainly, in the tropics, where economic pressure is very slight against parenthood, this situation has not resulted in any measurable race improvement. It seems pretty clear that it has brought about precisely the opposite results.

Of course, even under universal birth control the economic and social balance would still seem, at first glance, to be more heavily loaded against the prince and the genius than against the pauper and the moron. But this is in all probability as it should be, and the weighting of the scales against desirable qualities is probably more apparent than real. We have seen already that as men increase in ability and character they increase in an even higher ratio in their power to control and create environment. The five-talent man probably has less difficulty in doubling his capital than the one-talent man has in doubling his. Some philosopher—Emerson I believe—said that it was probably

easier for great men to do great things than for little men to do little things. At least, I doubt that any large race improvement can be brought about, when we succeed in making birth control the common property and privilege of all (as I sincerely hope we shall soon be able to do), by handing out economic doles to certain individuals or classes whom some politically appointed body of either learned or unlearned men may select as being the special pets of organic evolution. I think something, of course, can in time be accomplished by direct eugenical procedures of this sort; in fact, I believe a great deal can be done, for no doubt a vast amount of ability and character will be lost if encouragement is not given in the right way to the right sort of married couples. But I sincerely hope such measures will be undertaken with a great deal of caution and only after further research has been devoted to the study of the very complex factors involved.

EVOLUTION TO BECOME PEACEFUL, HAPPY AND BENIGN

The thing above all else which impresses my mind is that universal birth control will usher in a new sort of natural selection. Evolution will not cease. Evolution cannot cease. Just as always heretofore, the best adapted will survive. But I believe that at last those best adapted to culture and civilized values will come out of this humane and beautiful process. A new, perfectly natural Natural Selection will arise; but it will have lost all the red tooth and claw of the old natural selection; and, while it will be equally effective, the process itself will be happy, peaceful and benign.

If bringing or not bringing of children into the world can be easily, healthfully and happily determined by everybody, it seems evident that it will be

the *relative power of the parental instinct* which will determine who shall undertake parenthood and who shall not. As it is already among educated classes, those who want children are the ones who, as a rule, have them. Among these classes, beyond question, the race has been running for a generation between parental instinct on the one hand and social and economic ambitions on the other. With some, ambition has won and the life of the race has been sacrificed upon its altar. Among other people, the old biological instincts of family and home have won. Which of these classes is the better, is the question. Whether this selection has made these classes better or worse is probably the largest question which can be asked. But one thing seems evident: That when birth control becomes a much simpler matter than it has been heretofore, even among these privileged classes, and when it is extended to all classes, there will not only be a race between parental ambition and social ambition *within each class,* but there will be a race *between the classes* the like of which the world has never witnessed before. It will be a race not only for worldly success but a race by each class for the survival of its species and to its particular kind of people. The relative power of parental instinct to break through all economic and social barriers and pressures is the thing that will then determine which classes of human beings are going to survive and spread over the face of the world.

SOCIAL AMBITION OR LOVE OF CHILDREN—WHICH?

The highest question, then, which lies before biological and social research, the most insistent and vivid problem that should immediately engross all the interest and abilities of the statesmen, it seems to me, is

this: *Is there any biological linkage, any natural correlation, any necessary hereditary association, in the human constitution, between intelligence, health, longevity, beauty, sanity, moral character and social capacity on the one hand, and the parental instinct, the passion for home and children, the age-old passion for reproduction, on the other?* Do the good people of the world, those who have the things in their inborn natures which the race has learned to idealize, those virtues which sculptors have carved in their deathless marbles, which painters have made to live and move across their canvases, and which poets have enshrined in their verses—do these people love children any more than those in whom the great personal and social qualities have never come to such luxuriant and exuberant fruition? In short, the problem of the racial future simply figures down to this: Does the maid or the mistress, the prince or the pauper, the moron or the genius, desire children the more?

Eugenics does not want to make a new kind of man. It merely wants the best man to survive. We shall never find a better set of virtues than the good, old-fashioned ones. Heroism and gentility, strength and sympathy, virility and tenderness, power and delicacy, fortitude and reserve, intrepidity and urbanity, and all those gallantries and valors which the race has come to worship, all those attributes which are the outcome of sincerity, prudence, elegance, polish and grace of body and mind—no, eugenics will never invent a better list of virtues than these. It does not wish to. The animus of its dream is that these qualities shall be combined in as large a number of individuals as possible and that these individuals shall be the ones to whom the social order shall give the best biological chance, the chance to hand on this lavish biological heritage. Its hope is that these qual-

ities shall become the heritage of all men. And if man is going to have put into his own hands this instrument of birth control, then the problem of all problems is whether the people who possess this heritage in the most bounteous degree are the ones who have the greatest passion to hand on this inheritance and live themselves, immortally, in the long stream of future evolution. No other problem equals this in importance, no other question approaches it.

WILL INTELLIGENCE AND MORALITY SURVIVE?

This, then, it seems to me, is the future world stage of man, the world stage which the intelligence of man has set, the stage upon which the last act of the long drama of evolution is to be played before the curtain of life shall have been rung down by the hand of Time. If this be true, then the question which must penetrate deepest both into our minds and hearts is: Have we any evidence that will aid us in making even the vaguest prophecy as to how the drama shall proceed or who shall be the successful actors in the final scene, and how the play shall end? Is man going to deteriorate gradually, as some animals have deteriorated, until his species comes to a disgraceful lower form which is finally unable to negotiate even its own survival? Or will the human race go on about as it is going now and has been going on for ten thousand years—a general mixture of good, bad and indifferent, the bad elements sometimes in control of society and culture, with "right upon the scaffold" and "wrong upon the throne"; the indifferent elements sometimes in control, which is much the case at present; and at other blossoming times, such as the Alexandrian and the "most high and palmy state of Rome" and Greece, with society under the control of the able and the good? In other words,

What sort of man is going to reproduce his kind? Have we any evidence that there is a true biological linkage between the qualities that make what the race has come to look upon as a good man, and the passion to reproduce these good qualities in his children?

I cannot conceive of a more pressing problem for research than this. Our evidence is extremely meager, but what we have is mostly to the good. I have already submitted evidence that intelligent people live longer than mediocre and stupid ones. We are thoroughly justified in arguing from this that intelligence is associated with greater biological capacity. This hardly proves, however, that this long-lived intelligence has any stronger parental instinct and greater desire to rear a family and build a home to provide for its further survival; although on general evolutionary theory we would expect this to be true. I have also submitted Pearson's evidence upon the correlation between duration of life and the number of offspring. The reader will also remember that research proves that women who live to be seventy-five years of age or more produce on the average more children than women who die at fifty or sixty or seventy, even though the child-bearing period in these different groups might be approximately the same. Since intelligence is also associated with long life, there is evidently a tendency for intelligence to be associated with the instinct and capacity to reproduce itself in its offspring. I also described Doctor Bell's exhaustive study of the genealogy of the Hyde family in America, which you may recall showed that one- and two-child families tend to die out more rapidly than four- and five- and six-child families. If a man has five or six brothers and sisters he has much greater chance of producing a good family of his own than a man who has only one or two brothers and sisters or none at all.

The same is true, of course, of a woman who has several brothers and sisters, or one who is from a small family or is an only child.

I have little doubt that an exhaustive research would disclose that at least up to the birth-control period of recent times, small families have had less intelligence and have been of worse moral character than large families because they have been of inferior biological quality. The general theory of evolution would hardly leave us room for any other conclusion. However, with birth control in the possession of the more intelligent and denied to the less intelligent, this tendency has doubtless been greatly obscured and even reversed. The question at issue is then: Will not universal birth control restore this beneficent tendency to its rightful place in man's biological development? If it does, as I think it will, it seems to me that scarcely any higher call, both to personal and social ethics, has ever come from the voice of nature. Those who fight the spread of birth control are, it would seem, deliberately setting the stage for the breeding of stupidity, ill-health, shortness of life, and the natural immorality which is the necessary outcome of these things.

The reader will also recall that Woods's study of the royal families disclosed the fact that those most celebrated for intellect and morals also reared to maturity the greatest number of children. If we only knew this to be true in the general population, it would be the answer we are seeking to our question—namely, Is parental instinct linked with social capacity and intelligence?

The difficulty with this evidence is that it may be charged that breeding among the royal families proceeds under different conditions from those which obtain in the ordinary family. It may easily be

alleged that great political and even military pressure, and all sorts of selfish motives, have induced the royal families to produce children to the very limit of their capacity. Pearl has produced evidence that wealth and general economic and social well-being in themselves lead to a decline of sex activity and interest, and that the high birth rate of the poor is not the result of stupidity, but is chiefly the result of their greater sex activity and interest. He thinks that the poor seek in greater sex indulgence a compensation for the miseries of their existence. Perhaps the fact that following strikes and periods of idleness there is an increase in the birth rate of the laboring classes would, if examined, furnish further evidence in support of Pearl's conclusion. However, wealth and worldly success did not act in this way upon the royal families. Their high birth rate has always continued in the midst of luxury, social and political power.

Of course, there has probably been in this privileged group a genuine survival of fecundity. Down through the centuries, owing to the fact that this group has been set apart from the remainder of mankind, this tendency has had free play. The long-lived ones with many children have inherited the thrones and other instruments of survival. A king with a large number of sons, such as Charlemagne, who probably had one hundred or more, and King Priam, who had fifty, certainly had a greater chance of having a military genius crop up among them than a king who had only one or a very small number. Both the military genius and the fecundity of the fathers would be, thus, handed on down the line. I merely mean to point out that the evidence in the royal families that the parental instinct is linked with highly desirable human qualities may not apply to the population at large. I have little doubt that it does apply, but we need further proof.

THE BEST COLLEGE GRADUATES ARE SURVIVING

As a direct answer to the all-important question as to whether the instinct of parenthood is linked with intelligence and character, I know of but one piece of crucial evidence. This evidence has just recently been handed to me by Dr. F. A. Woods and this is its first publication in book form. It seems to me to be highly significant. Woods has taken the Harvard graduates for the classes of 1890, '92, '94 and '98, including over one thousand men, and has calculated their relative entries into *Who's Who* as associated with their marriages and the numbers of their children.

Without taking the space to spread out all of the data here, let me say that Woods finds that of the men in these classes who have been admitted into *Who's Who* only 9.71 per cent. are bachelors. Those who have married but have no children constitute 16.44 per cent. of those who have achieved distinction. Those who have married and have only one child constitute 16.91 per cent. of these distinguished persons. At this point there comes quite a distinct advance in that type of achievement which leads to inclusion in this roster of American fame. Those with three children run 18.92 per cent. in their proportion of the admissions and those with four children make up 18.09 per cent. of those who have gained entry. The rise is fairly regular from those men who have married but have no children up to those with four children or more. The slight drop between the two-to-three-child men and the three-to-four-child men would probably be ironed out with larger numbers.

The two striking things to be noted from this inquiry are the much higher ratio of the married men over the bachelors, and the distinct advantage of the three-and-four-child men over the childless and the

one-and-two-child men. Owing to the great advantage of the married men over the unmarried, it might be charged that a man's wife boosts him into *Who's Who;* but I hardly think that any man of experience will claim that four children are likely to do so! This would seem to furnish new evidence that the project to tax old bachelors with a view of inducing them to marry and reproduce their inability to achieve worldly success in a brood of children—unless it be looked upon by married men as a tax on luxury—might prove to be a very dysgenic undertaking.

THE HOME-LOVING INSTINCT IS BEING PRESERVED BY BIRTH CONTROL

I do not wish to draw unwarranted conclusions, but it seems to me that Woods has here given us the first direct proof, just as he gave us the first proof of mental and moral correlations, that in the general population, as well as in the royal families, the instinct of parenthood, the passion and capacity for an abundant, happy and wholesome family life, is associated in man's body and mind with those other mental abilities and temperamental qualities which lead to intellectual achievement and social success. It seems evident that we are not only building up social cones, but home-loving, home-building, child-rearing cones as well.

If we dare draw any generalizations from such a limited amount of evidence—and I think we can, because the evidence seems to be rather crucial—it may be, after all, that our alarm over the declining birth rate of our intellectual leaders and our successful citizens generally, such as our lawyers, doctors, clergymen, teachers, writers, skilled mechanics and the like, is only partly justified. Quite a part of it, at least, is surely only an indication of a new selection, an in-

dication that a new type—and apparently a better type—of citizen is going to survive and in time people the country. It may be merely evidence that nature is shuffling her deck of evolutionary cards anew. She may be getting ready for a new deal; and the child of the future may find that he has drawn a strong hand—indeed, possibly, all the aces in the deck.

There can be little question that, taken as a class, the more successful sections of our population are dying out. Pearl's graph showed that, and there is abundant other evidence. The upper ten per cent. of intelligence, for instance, which furnishes practically all of our college graduates, from whom come nearly three-fourths of our leaders, is probably vanishing. As a class these people are decreasing in numbers pretty rapidly. The casual observer would say they were dying out and would soon all be gone. He may be reckoning, however, without taking into account that never-ending, never-to-be-defeated determination of living nature to adapt her species to the circumstances immediately at hand. If one kind of life will not survive, nature tries another kind. From the standpoint of our ideals, this new type of life may be higher or lower, but from the viewpoint of nature her species are always ideal. From the standpoint of our ideals the Eskimo, for example, may be a pretty poor specimen; but from the standpoint of nature, he, with his small body to keep warm in a cold climate, would appear to be an evolutionary triumph. At least, the type which survives any change of conditions is a type *better adapted to survive amid those conditions.*

Just so, this may be what is happening in the apparent dying out of our intellectual and economically successful classes. The dying out may be more apparent than real. It may be that the most successful ones are *not dying out.* Their actual numbers are

at present decreasing. But it may be only a temporary decrease. It may be the beginning of an abundant increase soon, due to the preservation of the best and most prolific strains.

I think myself that this is exactly what is happening. I think it is happening at a pretty rapid rate and on a pretty large scale. And when birth regulation becomes a mere routine matter, when all children shall be brought into the world by the definite planning and forethought of the parents, I think this process will work much more rapidly and on a much larger scale. Our college graduates and our intellectual and business leaders, as a class, are passing away—but *not all of them.* It is highly probable that only those are vanishing who are not gifted by nature with the one supreme capacity for adaptation—the adaptation of reproducing their kind amid the conditions of civilized life. Those who are adapted to this vast new change in environment, this change from the jungle to polite society, from the wild, hunting, fighting stage to the economic and cultural struggle for existence—these *are* surviving; they are carrying on and will furnish the hereditary foundations for a new and greater race. We have heard much of late of "The Passing of the Great Race"; it may be that in quite another sense from that which the author of this famous phrase had in mind, the truly GREAT RACE is just coming into its own.

BIRTH CONTROL GIVES A WIDER SCOPE FOR EUGENICS

The reader should not gain the idea that this new agency, by which the race is expected to improve itself by the use of its own volition and passions, will mean the abandonment of the program of eugenics. Quite the contrary. It will only add to its effectiveness.

Pearl expresses doubt that idealistic appeals will induce persons of rich racial qualifications to increase the number of their children. With the economic and social burdens of parenthood as great as they are now, he doubts that even the most patriotic appeal will induce even high-minded people to increase their load. I find it difficult to share this doubt.

There can be little question that in all ages religious appeals, for example, have influenced the birth rate. As an illustration, the Mormon people of Utah, under the influence of their religious beliefs, have kept up a higher birth rate among their intellectual and professional classes than the people of any other State of the Union. Their theology teaches that every child that is born means that this act by human beings gives another soul its opportunity to pass from a lower stage of existence, through the trial state of this bodily life, on to a higher plane of spiritual evolution. I personally have no more belief in the Mormon theology than I have in any other theology. Science is giving men, I think, a better religion and a better idea of God than any dogmatic theology has ever given them. It may easily be charged, and perhaps with considerable justice, that science is merely giving men a new dogmatic theology, even more dogmatic than the old. However that may be, Prof. Roswell H. Johnson of the University of Pittsburgh, president of the American Eugenics Society, who has recently studied the Mormon religion at first hand and has lived for a time among its people, believes that the Mormon religion is the most eugenical religion in the world. He is speaking purely of its biological effect and not of its scriptural or theological verity. One can readily see that if the birth of each child were regarded as a lofty and disinterested act of spiritual devotion, a profound and inspiring act of faith and worship, this

belief would be pretty certain to influence conduct. And it would seem that this belief would have the deepest effect upon the noblest and finest minds and spirits of the race. At least, the statistical evidence now in hand, recently gathered by Professor Johnson, leaves a clear conviction that this has been the biological effect produced by the Mormon faith.

I trust the reader will have the tolerance to understand that this is no indorsement of the Mormon religion, but merely a presentation of the scientific facts. I feel convinced that in time a still more eugenical religion and a still deeper and sounder biological conscience can be developed by the teachings of pure science, especially among those robust and wholesome people whom we wish to see as the parents of the next great race of men.

IDEALISTIC APPEALS ARE NOT IN VAIN

If we look at other religions, there can be little doubt that they have affected the biological life of the people. I have already pointed out that the Roman Catholic church has probably affected the birth rate of its adherents in an unfavorable way, if we are permitted to look upon the results in a purely scientific spirit. The Catholic church may have in view other spiritual ends which in its judgment outweigh any untoward biological results; but from a purely scientific standpoint I cannot avoid the impression that the net result is unfavorable to the future of Roman Catholicism as an effectively organized religious faith.

The Japanese and Chinese religions have some powerful eugenical appeals contained in their doctrines. The worship of ancestors and the effort to improve the spiritual state by producing a large number of children afford surely a powerful inducement to

undertake the rearing of a family. Since this also improves the chances of the devotee himself of obtaining a high standing in the next world, it would seem, again, that it would be the best and most spiritual persons who would be most profoundly affected by this religious conviction. That it tends, at least, toward the biological survival of the religious temperament, I see no reason to doubt.

As another example, the Jewish religion contains many excellent eugenical elements. This is particularly true of their lofty ideals of home life and of chastity, of their stern preachments against anything approaching free love, and their strong tendencies to hold their families together and take care of their own kin. All of these have probably worked marked benefits, in a biological way, to this race.

I do not believe I am romancing in saying it is at least conceivable that when birth control becomes a part of ordinary human life it will set up a new kind of rivalry among religions as to which shall be able to formulate in its doctrines the profoundest eugenical appeals. It seems quite possible that that religion which could devise the most effective spiritual inducements to its adherents to bring large families into the world would, in the long run, provide itself with the largest number of adherents. Out of such a religious rivalry, when the very loftiest motives that exist in human nature should be appealed to, it again seems that it would be the best people of the race who would respond.

Indeed, it may well be that profound changes will occur in the racial composition of various nations. Upon this point I am merely speculating. One fact worth thinking of, however, is that the Jewish race, by its long, long life for many centuries in the ghettos of the world, has become especially adapted to survival

amid city conditions. The Jews have a high immunity from tuberculosis and other diseases under which other races dwelling by their sides go down. We have come, through science, to be a world of city dwellers and, no telling, the Jewish race may be the one that will win out amid such an environment. These are idle speculations, of course, but they do float across the imagination of a student of biology who is trying to penetrate the future. Should this speculation prove true, that other races will be out-bred and supplanted by the Jew, or by some other race even better adapted to city life, then if we are going to be true to our much-vaunted Nordic traditions of sportsmanship, we should say, "Let the best man win!"

I believe, however, that idealistic appeals will have some effect. If I am permitted a personal reference, I might say that a number of parents—surely two score or more—have either written me or told me personally that, since reading my book, *The Fruit of the Family Tree,* they had already added or planned to add one or two children to their families. If such a slight appeal as this has such an effect, I think it reasonable to believe that appeals of a profounder and a more far-reaching nature will have a much more beneficial effect upon the birth rate of those very classes upon which civilization depends for its creation and upkeep.

I submitted, in the above mentioned book, evidence first collected by Woods and later supplemented by my own researches, that indicated that the introduction of the Greek ideals of facial beauty following the Renaissance changed the bony structure and facial appearance of the people of northern Europe. Of late I have been studying still more portraits of the north European peoples of the past three hundred years, and my conviction grows that the facial anatomy of the north

European races, especially the structures about the nose and eyes, has undergone a marked change, with the result of a great improvement in personal beauty. This change may be due to glandular or chemical changes of some sort which are correlated with certain types of bony structure and musculature. However, I think Woods's suggestion that men learned to admire the Greek ideals of beauty which were introduced by the Renaissance, and that this led them to select wives of that type and breed children from these types of beauty, is the most plausible explanation. If this be the correct interpretation, it furnishes strong evidence of the power which eugenical appeals can be made to have as they are consciously formulated in the future.

The experiments in the education of character now going on at several universities, I have little doubt will ultimately have profound effects in determining mate selection. I look for scientific character education to be a very powerful aid in the biological improvement of mankind. I also look for educational psychology, as it is able more and more to measure the abilities and aptitudes of men and as we rear our children in an atmosphere charged with the values and meanings of the differences in biological and spiritual excellence among men, to have its effect upon mate selection; and I believe that effect will be very considerable. When children grow up with a keen sense of the meaning of mental and character measurements and see what these inborn differences mean and realize these differences are inherited, it will, I feel sure, profoundly influence young men and women in their marriage choices. Outside of numerous effects in improving compatability among married persons, it is quite conceivable that the ideal of fertility—that is, the possibility of abundant children—would, in itself, become a very significant factor in determining marriage choices. For example,

it is quite conceivable that a young man who had grown up amid a family of four or five brothers and sisters, a man endowed with the same biological capacity and imbued with the happiness and privileges of an abounding home life, when he once understood that fecundity is a very definitely inherited trait, would, to put it plainly, steer clear of marrying a woman who was an only child or who had perhaps only one brother or sister. And of course, the same tendency would work even more powerfully with women endowed by nature with large and generous instincts of maternity.

I do not wish the reader to gather that I am asserting dogmatically that any of these things will take place. The factors involved are so bewildering in number and complexity, and so many of them are still in such obscurity or else completely unknown, that neither I nor any one else can predict with certainty what is going to happen. I am only placing before the reader, after years of reflection and after studying all the available evidence, what seems to me is *most likely to happen.* I think eugenics has an immense future. I think universal birth regulation will be one of its chief instruments, but by no means its only instrument, for lifting the race to higher levels of health and sanity.

OUR CIVILIZATION WILL NOT FAIL

Of course, it may be that with universal birth control there might come an actual reduction in the numbers of the race. If so, this could be temporary only. If the reader will recall the arguments by Dr. Alexander Graham Bell upon the point of race suicide, it appears that in the end it would be the most fertile members of the race that would survive. Should our race even be reduced to its original single pair, it is ob-

vious that this second Adam and Eve would be the inheritors of the accumulating fecundity of a long period of selection with this end in view. I do not think we need concern ourselves about any such possibilities. The iron law of population growth will go marching on irrespective of the feeble efforts of man. But I think man can to a considerable extent alter the quality of the population that shall come out of the process.

It may be also, of course, that universal birth control will lead to a still further reduction in the birth rate of our leaders. It is even possible that the necessary quota of leaders would be so reduced that our present social order would disappear. There was never a time when society needed so many leaders of so many different types as it needs to-day. A great many of these leaders are childless at present. As we have seen, nearly ten per cent. of the Harvard graduates reaching distinction were bachelors. About sixteen per cent. were married but childless. Such men and women furnish a very high percentage of our ablest social servants; however, since they do not reproduce anyhow, further birth control will not materially affect them. But even if our present society should go under, if the priceless boon of birth regulation should remain in the hands of the race, then in time we may still hope that another race, better adapted to a life of culture, manners and intellectual adventure will rise and will build again a civilization of even greater polish and grandeur.

But I believe that with the use of the educational methods and the multiple agencies of social appeal which science has placed in our hands even such a temporary catastrophe can be avoided. It would surely seem, that man, with all the instruments of science in his hands, can save his present social order and its cultural achievements, and at the same time do some-

thing to improve his breed, something which shall decrease the inborn misery and increase the inborn happiness of the men of to-morrow. Surely he can make use of the intelligence which evolution has given him to influence that evolution in the future, just as he now bends other laws of nature to the uses of his intelligence and will. Man has paid such a fearful price for his intelligence and his capacity for moral emotion that it does seem he ought to be able to make them pay for themselves, not merely in giving him an occasional cultural, economic and political joy-ride, but in improving the might and quality of his own intellect and character. I, for one, believe he can do this and I believe he will.

BIRTH CONTROL WILL INCREASE MORALITY

Of course, there will continue to be objectors to birth control, but in my belief no efforts of man can now stop or greatly retard its universal application. Societies and organizations for birth control propaganda will likely be unnecessary. They will probably go out of business because their objective has been achieved. Neither thunders of the Church nor the efforts of the State to prevent the use of this means of human happiness and health, will,I think, be of much avail.

As a matter of fact, if both Church and State would take a long and sympathetic look ahead, they would see that probably no greater moral agency has ever been devised than the power to determine whether moral or immoral people shall be born. There are some people who are naturally good; there are others who find it very difficult to be good; while there are still others upon whom we have to use all the agencies of education and the powers of the police, to compel them to be good. If this be true, and no one

except our extreme Behaviorists seems to doubt it, then nothing would add more to the moral beauty of the world than that its children should be born from those parents who are naturally good. And universal birth control will, I think, rapidly breed the race in the direction of natural goodness. It is often objected that the spread of birth control will lead to an increase in promiscuous sex relations and sex immorality. I think it quite possible that we may have to reckon temporarily with this difficulty. But it is perfectly obvious that if the possession of birth control is a thing which leads to sex immorality, it is itself the very means for bringing immoral people of this kind to their own end. The mere fact that they do not reproduce their own unchastity is the very thing which weeds this kind of sterile passion out of the race at large.

We could bring the same objection that sex immorality is increased by the building of cities or the inventing of automobiles, or indeed anything which increases human contacts and gives free play to human passion, with no objective except its own immediate gratification. As I have repeatedly pointed out, man has made such stupendous efforts for ten thousand years or more to keep alive his incompetent, stupid and immoral strains, that we may have to pay a temporary penalty, in wiping them out. We may have, at least, to endure for a while the spectacle of seeing them wipe themselves out by the most dramatic, bio-ethical process which the world has ever seen. The silly flapper, the Bohemian, the devotees of night-clubdom and those addicted to pleasure for its own sake without thought of the morrow or sense of responsibility to the race will leave no children behind them to perpetuate their unchaste and unsocial breeds; and the places that knew them shall know them no

more. The fool, when even he can prevent the reproduction of his own stupidity, will, as never before, perish by his own folly, and his breed will vanish with him. Thus birth control will purge the race on a grand and dramatic scale, and at last give to chastity, when it is coupled with great social abilities and reproductive passions, its chance to survive and to people the world with its possessors.

CIVILIZATION WILL EVOLVE A CIVILIZED MAN

We see thus that while conscious and positive eugenics is still the largest human program that confronts our intelligence, while it can enormously aid the processes of human evolution, yet it may well be, as I have observed, that universal birth control will set going a new, perfectly natural, Natural Selection. The agencies of this natural selection will be man's noblest impulses and his largest social capacities. It is always "the man who is left," whether he be left behind by war or pestilence or famine or birth control, who will people the world. And since this man will be descended from the ablest and best, the most far-seeing and unselfish, it follows that civilization will, through the aid of science, evolve a naturally civilized man, instead of the veneered barbarian whom we are trying, with indifferent success, to civilize to-day.

It may be objected that such a creature will be merely a sort of glorified mollycoddle who has lost the old daring, chivalry, love of adventure, and fighting trends of the race. I hardly think we need to feel alarmed. Any man who, in this complex social order, with all the hardships that it entails, rears four or five children and at the same time fights his way to intellectual distinction, leadership and worldly fame, will surely possess, of necessity, those organic drives and powers of social coherence essential for

keeping his own society going and furnishing men at the same time abundant values for which and by which to live.

EVOLUTION WILL LOSE ITS RED TOOTH AND CLAW

Evolution has been a bitter process. "All wild animals die a tragic death." They die fighting to their last breath for the chance to live. To some extent, man has been able to suspend this process; but, after all, until he could control his reproduction, he had no way to escape the red tooth and claw of nature, in order to improve his breed. But now, at last, by the discoveries of the laws of his own biology and his control of reproduction, it is within his power to set his feet upon a new pathway of evolution that will lead him under sunnier skies and towards happier goals. For if there really are, as the researches I have presented strongly indicate, here and there in the population those rare and choice spirits who are endowed with both rich social and racial powers and who, from their very natures rear large families, then under universal birth regulation they and their children will at last have their true biological opportunity. They will still be, just as in the old days of brute natural selection, what Huxley called "the darlings of destiny." They and, in time, they alone, will carry on the reproduction of the race and constantly select it upwards by the benign and happy processes of culture and lofty social passion. Man will no longer have to wade, as death selection has always heretofore compelled him to wade, through the bloody mire of natural selection, in order to win his biological gains.

THE NEXT AGE OF MAN

The progress of man from savagery to libraries, from unmitigated brutality to the Red Cross, from

the medicine man's tom-tom to the modern hospital, from incantation to bacteriology, from caves to sky-scrapers, from word of mouth to newspapers and radio, from walking to airplanes, from cannibalism to a world-wide cuisine, is, to a man of imagination, a drama of never-ending significance and grandeur. Here and there someone has thought of something new, and straightway the whole environment of man has been changed; and new selective agencies have at once set to work to fit his constitution to the new life into which he has thus been ushered.

It was, perhaps, just some one lonely genius who first learned to fashion spears and arrows and to sharpen flints. He thus lifted the whole race from a barehanded conflict with nature into the Stone Age. Some other genius—I wish I knew who he was—mixed nine parts of copper with one part of tin and lifted the race from the stone into the Metal Age. Buddha, Confucius, Jesus and other great prophets and saviors, lifted men into the Humanitarian Age. Galileo, Newton and Bacon lifted the race into the Scientific Age. These same men, and such men as Faraday, Clerk-Maxwell, Franklin, Gibbs, Edison, Marconi, have lifted us into the Electrical Age. And now it is evident that Darwin, Weismann, Mendel, Morgan, Galton, Woods, Pearson, Pearl, Papanicalaou, Wundt, Hall, James, Seashore, Giddings, Osborn, Terman, Thorndike and their great confrères, are, without the world realizing it, lifting the race into the Biological and Psychological Age. This will be the age when a knowledge of man's psychical and physical nature will be the deciding factors in determining his customs, his education, his economic and political structures, his social behavior, and, above all, will determine his reproduction. These will be the forces that will determine the man who shall be left; and the man who is selected

by these happy processes to be left is the man whose noble nature and whose virile but gentle temperament will fill the atmosphere of the future world.

EUGENICS A RACIAL RELIGION

If, finally, the considerations of this book be valid, this Bio-Psychological Age will be the next and probably the last great age of man. To what heights man may yet climb, he does not and cannot know. But, despite the follies of his own civilizations, his reversed birth rates, and similar unfortunate biological obstructions, I am convinced his evolution has not ceased; he is steadily surging forward, and these new controls of the forces of his own reproduction will only accelerate his pace. Cities, drawing rooms, soft beds; luxurious foods, counting rooms and machine shops, cannot stop the ceaseless march of men whose innate natures are driving them on to unknown but higher organic goals.

BIRTH SELECTION INSTEAD OF DEATH SELECTION

Consequently, after twenty years and more of intensive study and reflection, this is what this new word, eugenics, has come to mean to me. It means to me not merely men well born by some intelligent choice of their immediate ancestry, as Galton and many others have conceived it. It seems to me, with the new vision which biology has given us since Galton's great conception, that eugenics has come at last to mean *a benign evolution, set going by man's own control over natural forces.* The chief agent of this new evolution will be the joyous exercise of man's richest moral and social emotions and capacities. In this light the word eugenics means the institution of intelligent and happy processes of a natural and beau-

tiful *birth selection* in the place of the bloody, natural *death selection* which has so far been the unhappy lot of all organic beings.

THE HOME, THE SYMBOL OF THE NEXT AGE OF MAN

The symbols and the instruments of this next age of human evolution will be the cradle, the home, the school, and the temples of religion, art and culture. These will be the determining forces which shall decide who shall continue the race, instead of the bloodsoaked battlefield of the struggle for existence on which every previous gain of biological capital has been won.

Just what kind of creatures these men and women who will people the world during the next age of man will be I think we know. They will be good people, healthy people, intelligent people, civilized people. But what kind of social order they will build we do not know nor do we very much care. For, if the social order be the outcome of the natures of men and women we can safely believe that such men and women will build a society that will give fulfillment to their excellent natures. I believe, however, that we can already see the direction in which that social order will trend and prophesy with some assurance its general character and tone.

At this point I recall incompletely through the mist of the years a boyhood memory of a noble passage from the writings of Brooke Foss Westcott, Bishop of Durham, the great promoter of coöperatives in England. And, in bringing this volume to a conclusion this passage aids my imagination to picture the kind of world which I think intelligent and good-natured men in time will build for themselves and their children to live in.

Elaborating this passage very greatly, what we of

all faiths, all parties and all creeds, look for, hope for and pray for, is a society where class shall be bound to class by the fact that the humblest man as well as the greatest man shall participate to the limits of his capacity in the great treasures of the common life—the treasures of wealth and leisure, the treasures of knowledge, religion and education, the treasures of art, adventure and beauty; a society where the members of each group of workers shall be fitted and adjusted to their work by vocational guidance and training, by psychological and personality measurements, by the disciplines and inspirations of education, by economic and industrial adjustments, and by political procedures and social processes, so that *they will find in their work* the development of their character and the consecration of their powers; a society where the highest ambitions of men shall be to become leaders in their own various social classes, each using his own special powers without waste and each following the common traditions on to noble issues; a society where every man's education and his social and industrial freedom shall cause him to feel that he is not a mere cog in a great world economic and social machine, but that, by the token of whatever powers nature may have given him, trained to the full, he will know himself to be a unique and wonderful person, capable in his own right of determining the meanings and the values for which and by which he shall live; a society where every man shall know and be stimulated by the knowledge that he labors not for himself alone nor for his family alone nor for his country alone, but where every man shall labor, amid a free air of hope and opportunity, for individual completeness and social effectiveness, for a better, healthier and happier human race, and for the three great things that men live by and die by, namely,

liberty, beauty, and "that high unknown purpose of the world, which we call God."

Thus, it seems to me, intelligent men can to-day cherish a strong and reasonable faith that man will weather the evolutionary storms that have swept his life throughout all the tides of history, even the storms set going by the biological follies of his own ambitions and his own cultures. It seems to me that intelligent men can to-day hold a reasonable conviction that man is going to come at last into a peaceful port where he may dwell happily in a universe which he has won to friendliness by his own science—a science created by the very intelligence and moral emotions which his forbears purchased for him with their blood.

Perhaps, after all, this was what the majestic mind of Galton did envision when he said, "Eugenics will sweep the world like a new religion." For, it seems to me, if men are privileged to aid—as I think all right-minded men can now aid—in the boundless and abounding process of improving the inborn natures of the race that is to be, surely this is religion enough, ethics enough, culture enough, to satisfy all the organic trends that mortal flesh is heir to, whatever may be the "new varieties of untried being" which may lie ahead in that "bourn from which no traveler e'er returns."

It was Saint Paul who said: "We all, with open face beholding as in a glass the glory of the Lord, are changed into the same image from glory to glory. . . ."

And I see no reason why men cannot cherish a well-grounded and constructive faith that, through their own science, they shall go on with open faces, beholding the glory of the Lord, making intelligent use of His laws to guide their own evolution from glory to glory; evolving by their own intelligence toward that

Divine Image which is the most beautiful and alluring vision within them. In this sense, eugenics is as large as man's capacity to hope and dream, as deep as his capacity to penetrate and control the laws of his own nature, and as wide as his capacity to organize his social efforts to ever more and more fruitful ends.

THE END

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